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NERVOUS AND PSYCHIC DISEASES

Г. В. МОРОЗОВ,
В. А. РОМАСЕНКО

НЕРВНЫЕ И ПСИХИЧЕСКИЕ БОЛЕЗНИ

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PREFACE

That the nervous system plays a very important role in every disease needs no proof in our days, and he who has no knowledge of neuropathology and psychiatry cannot understand the course of any disease as a whole. At the same time it must be admitted that teaching neuropathology and psychiatry to future nurses and physician's assistants is no easy matter because of the difficulty of the subject and the too little time allotted to its study. That is why we must welcome the appearance of this book.

This textbook combines clarity of exposition with adequacy of scope and presents the basic principles of Soviet psychiatry and neuropathology.

The authors have very correctly included fundamentals of normal and pathologic anatomy and physiology in the book since, by the time neuropathology and psychiatry are studied, students forget some of these fundamentals learned during the first years in medical school.

Considering the future practical needs of secondary medical school graduates, the questions of nursing nervous and mental patients have been treated in a special chapter.

I am confident that this textbook will be a welcome addition to the already existing in the U.S.S.R. good books on neuropathology and psychiatry and will help in teaching these subjects in secondary medical schools.

Professor Y. A. POPOV,
Member of the U.S.S.R. Academy
of Medical Sciences

FROM THE AUTHORS

This textbook is intended for secondary medical school students and is aimed at acquainting them with the main forms of nervous and mental diseases likely to be encountered by physician's assistants or nurses working in any other branch of medicine.

Since the students learn the anatomy of the nervous system during their junior years in school this part is dealt with very briefly, much more attention being devoted to questions of normal and pathologic physiology.

We have found it expedient to present the principles of treatment with reference to definite diseases.

Since nursing patients with nervous and mental diseases has its own characteristic features, it has been treated in a special chapter.

INTRODUCTION

Neuropathology and psychiatry are closely related disciplines primarily because the nervous system is the main subject of study of both.

Neuropathology is concerned primarily with lesions of the nervous system characterized by impairment of sensitivity and movements, as well as dysfunction of the sense organs; it also elaborates therapeutic and preventive measures for these affections.

Psychiatry (Greek *psyche*—soul, and *iatreia*—healing) studies disorders manifested in impairment of man's cognitive activity, his emotions and behaviour. In other words, psychiatry deals with disturbances in man's higher nervous activity.

It is very important for neuropathologists and psychiatrists to elucidate the character of the disease (infection, intoxication, vascular affection, metabolic disturbance, etc.).

The intermediate medical personnel working in any branch of medicine must have knowledge of the fundamentals of neuropathology and psychiatry because early identification of diseases of the nervous system is very important for both therapy and prophylaxis. Moreover, the patients of any medical institution may develop nervous and mental derangements in addition to disturbances of the body. It is well known, for example, that patients suffering from acute infectious diseases, internal diseases (liver and heart), hypertensive vascular disease, etc., sometimes manifest psychoneurotic disorders. Some of these patients need not be transferred to special neuropsychiatric institutions and may be nursed on location.

Nurses and physician's assistants must be able to administer first aid in acute cases of nervous and mental diseases, for example, in cerebral hemorrhages, injuries to the head and convulsive seizures (especially, in epileptic states), and to care for patients with a disturbed consciousness which is often marked by motor excitement that constitutes a hazard to themselves or those around them, etc.

Neuropathology and psychiatry have a long history. The investigations of the great Russian scientist Ivan Pavlov have played a very important part in the development of these sciences.

Soviet neuropathologists and psychiatrists are greatly contributing to prevention and treatment of nervous and mental diseases.

A BRIEF HISTORY OF RUSSIAN NEUROPATHOLOGY AND PSYCHIATRY

The development of neuropathology and psychiatry as independent clinical disciplines has been closely connected with the studies of normal anatomy and physiology of the nervous system and the progress made in other fields of knowledge. Russian neuropathology and psychiatry are based on the materialist teachings of I. Sechenov and I. Pavlov. The natural-science and philosophical views of these outstanding scientists formed under the influence of Russian materialist philosophy of the 19th century (N. Chernyshevsky, N. Dobrolyubov, A. Herzen, V. Belinsky and others).

Ivan Mikhailovich Sechenov (1829-1905) was, as I. P. Pavlov called him, the "father of Russian physiology". He was the first in the history of science to make an attempt at explaining mental phenomena from the standpoint of the reflex theory. In his book *Reflexes of the Brain* (1863) he proved that all the manifestations of the human mind can be explained by reflex processes operating in the central nervous system. In other words, he showed that the activity of the brain is wholly dependent on the stimuli in its environment. He thereby disproved the concepts of a "soul" existing in the human organism and exercising control over thoughts, volition and feelings. He demonstrated that the complex psychic functions are nothing but the result of cerebral activity.

Ivan Petrovich Pavlov (1849-1936), the brilliant successor to Sechenov's principal ideas, developed a theory of higher nervous activity which is the basis of modern medicine in general, and neuropathology and psychiatry in particular. His teaching

on unconditioned and conditioned reflexes, and processes of excitation and inhibition underlying cerebral activity forms the materialist basis for studying both normal and pathologic activity of the central nervous system.

Valuable contributions to the science of the brain were also made by other scientists who investigated the physiology of the nervous system. Particular mention must be made of N. Wedensky, A. Ukhtomsky, V. Danilevsky and I. Dogel.

Neuropathology began to develop as an independent scientific discipline in Russia in the 1860s. The founder of Russian neuropathology was the outstanding clinician *Alexei Yakovlevich Kozhevnikov* (1836-1902). He was the first to organize a department of nervous diseases at the medical faculty of Moscow University (1869) where he lectured on nervous diseases (neuropathology had theretofore been taught as part of the clinic of internal diseases). He won world renown by his brilliant clinico-anatomical studies. The disease described by him and characterized by peculiar epileptiform seizures is known as Kozhevnikov's epilepsy. At that time nervous and mental diseases were taught as one course, but subsequently (1887), on Kozhevnikov's initiative and according to the plans drawn up by him, an independent mental clinic was set up and S. Korsakov, one of Kozhevnikov's pupils, was soon appointed to teach the course in psychiatry. The list of Kozhevnikov's pupils includes such well-known clinical neuropathologists as V. Roth, L. Darkshevich and G. Rossolimo. A good deal was also done in studying the anatomy of the nervous system (V. Bets, V. Bekhterev et al). For example, V. Bets (1834-1894) discovered the giant pyramidal cells in the motor zone of the cerebral cortex and studied their topography and development. He carried out extensive research in the macroscopic topography of the surface of the cerebral hemispheres and is considered the originator of the teaching on the cytoarchitecture of the brain.

Vladimir Mikhailovich Bekhterev (1857-1927) was an outstanding neuropathologist and psychiatrist who engaged in multifarious scientific activities and left an extensive legacy in

neuropathology, psychiatry, anatomy and physiology of the nervous system.

Many anatomic formations of the brain and spinal cord were thoroughly investigated and described by him. He studied and described a number of nervous diseases, as well as reflexes in and symptoms of various nervous and mental diseases. Many of his studies were devoted to treatment with hypnosis. Bekhterev was the first in Russia to establish a research psychoneurological institute (now the V. Bekhterev Institute in Leningrad).

Valuable contributions to the development of Soviet neuropathology have been made by M. Astvatsaturov, M. Krol, M. Margulis, V. Khoroshko, A. Grinstein, Y. Sepp, N. Grashchenkov, N. Konovalov, N. Bogolepov, I. Filimonov and many other scientists.

Russian psychiatric history can be traced back to ancient Russia. Psychiatric aid is known to have been administered to patients in the monasteries of the Kiev Russ in the 10th and 11th centuries. At the time the origin and essence of mental diseases were explained from a religious point of view. It should be noted that even at that time mental patients were treated much more humanely in Russia than in the West-European countries where they were subjected to cruelties since mental diseases were held to be the "work of the devil". Many mental patients were burned at stake as sorcerers and witches "possessed of the devil". In Russia mental patients were considered God's fools and were cared for in monasteries.

The idea that insanity was a disease won increasingly greater recognition in the Moscow Russ in the 17th century. The first insane asylum was opened in St. Petersburg in 1779; a similar institution, subsequently named the Preobrazhensky Mental Hospital, was established in Moscow in 1809.

The patients in mental hospitals were treated harshly.

Various means of restraint were used: the patients were tied hand and foot, were shackled and put in strait-jackets. The works of the Russian physicians of the first half of the 19th century favoured the development of the science of psychiatry in Russia. This is proved by investigations of such brilliant rep-

resentatives of Russian psychiatry as I. Balinsky, I. Merzheyevsky and V. Kandinsky.

I. Balinsky (1827-1902), professor of the St. Petersburg Medicosurgical Academy, was the first in Russia to teach a course in psychiatry (1857). A mental clinic was opened at this Academy in 1867. Balinsky devoted much attention to questions of nursing and treating mental patients.

I. Merzheyevsky (1838-1908) who was Balinsky's pupil and developed his materialist ideas is widely known for his investigations of the pathologic anatomy of general paresis, microcephalic idiocy and other psychoses.

V. Kandinsky (1849-1889), a prominent clinical psychiatrist of that time, is known for his studies in hallucinations, delirium and a number of other symptoms and syndromes of the schizophrenic reaction, and for his contributions to the knowledge of psychopathias and to forensic psychiatry.

The achievements of psychiatry of that time are associated primarily with the name of S. Korsakov.

Sergei Sergeyevich Korsakov (1854-1900), outstanding Russian scientist, physician and public figure, was one of the most prominent Russian psychiatrists and the founder of the Moscow psychiatric school known for its humane approach to mental patients.

In Russia the system of nonrestraint of mental patients owes its introduction to Korsakov. Confinement of mental patients to bed in mental hospitals proposed by Korsakov was an enormous achievement. Mental patients were thereby put on an equal footing with the usual somatic patients and the psychiatric institutions were transformed into hospitals where mental patients were given medical treatment. Korsakov introduced nursing into mental hospitals.

Korsakov believed mental disease to be based on injury to the brain and affection of the entire organism. He described a disease whose clinical manifestations are essentially the same as in polyneuritis with the addition of a peculiar loss of memory. The clinical picture he described won world recognition and is known as Korsakov's (Korsakoff's) psychosis. That not only served as

convincing proof of the correctness of materialist understanding of the essence of psychosis, but also ushered in a new era in psychiatry. Before Korsakov psychiatry was dominated by the so-called symptomatic trend in which various symptoms or symptom complexes, for example, mania, amentia, melancholy, etc., were considered disease entities. Korsakov showed that the nosological (*nosos*—disease) trend which distinguished diseases with a definite cause, course and effects was the only correct approach. The disease he described was precisely such a nosological entity.

Thus the founders of Russian psychiatry—Korsakov, Merzheyevsky, Bekhterev et al—laid a firm foundation for materialist, natural-science study of nervous and mental diseases. Their ideas were subsequently developed by their pupils and followers—S. Sukhanov, V. Serbsky, P. Gannushkin, N. Bazhenov, V. Osipov, A. Bernstein, V. Gilyarovsky, T. Yudin and Y. Krasnushkin.

After the Great October Socialist Revolution theoretic studies assumed a new scope, and new methods of treating and preventing nervous and mental diseases were evolved; all the achievements of neuropathology and psychiatry are therefore inseparably connected with the socialist system of the state. The enormous successes of the national economy, the steady rise of the material and cultural standards of the entire population, the state-wide measures of public health protection and the achievements of Soviet medical science and practice have brought about a diminution in disease incidence, that of nervous and mental diseases in particular. Soviet psychiatrists and neuropathologists devote considerable attention to measures aimed at preventing disease and at ameliorating the mental and nervous condition of the entire population. The accessibility of medical aid to the entire population (dispensaries, polyclinics, health centres at industrial enterprises, etc.) and the strict specialization of the therapeutic and prophylactic institutions are conducive to early diagnosis and effective aid to patients.

The development of Soviet psychiatric science has been characterized all along by a struggle against idealist views (freud-

ism, psychomorphologism). Valuable contributions to the development of national psychiatry have been made in Soviet time by V. Gilyarovsky, V. Protopopov, V. Osipov, M. Gurevich, M. Asatiani, Y. Popov, A. Ivanov-Smolensky, O. Kerbikov, A. Snezhnevsky, T. Simson, G. Sukhareva, A. Zurabashvili, V. Myasishchev, I. Sluchevsky and A. Megrabyan.

A new stage in the development of psychiatry set in after the October Revolution. Of great significance in this respect was Ivan Pavlov's teaching, a firm natural-science foundation for further successful studies of nervous and mental diseases.

NEUROPATHOLOGY

GENERAL INFORMATION

FUNDAMENTALS OF ANATOMY OF THE NERVOUS SYSTEM

Role of the Nervous System in the Vital Functions of the Organism. All animal organisms, including man, are always exposed to innumerable environmental influences. The nervous system responds to the various external stimuli with certain reactions. Such reactions are, for example, jerking away the hand on contact with a hot object, winking or closing the eye on penetration of a foreign body into the eye or on looking at a very bright source of light, and salivation in response to the presence of food in the mouth.

The human organism cannot live without constant and close interaction with the surrounding world. The organism adapts itself to the external influences and maintains a continuous fine balance with the environment by means of the nervous system.

Pavlov wrote that the nervous system "is an inexpressibly complex and fine instrument of communication of the numerous parts of the organism with each other and of the organism, as a most complex system, with the innumerable external influences".*

Man communicates with his external environment through the sense ograns—analysers (organs of hearing, vision, etc.). The stimuli falling on the nerve endings of the sense organs (receptors) are transmitted through peripheral nerves to the central nervous system. What takes place in the environment is thus signalled to the organism. It has long been known that the functions of all of man's organs and systems are coordinated. This coordination is also effected by the nervous system. The human brain is thus the chief regulator of all the vital activities of the organism. The brain, its cortex in particular, operates the most complex processes of our mental life; the multiformity of movements which form the labour processes and man's behaviour as a whole is dependent on the function of the brain.

Hence, firstly, the nervous system maintains the connections

* I. P. Pavlov, *Complete Works*, 1951, Russ. ed., Vol. 3, Book 2, p. 323.

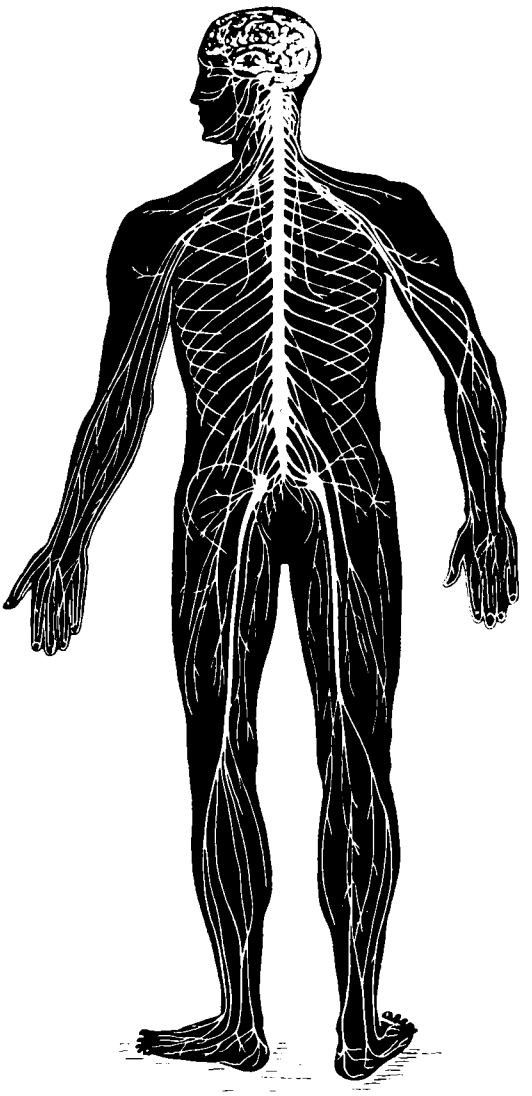

Fig. 1. General view of the nervous system

of the organism with its environment which manifest themselves in formation of very fine and complex interactions between the organism and the external environment, secondly, it regulates all the activities of the organism, and, thirdly, it ensures the unity of the external manifestations and internal vital activities of the organism. Man's nervous system (Fig. 1) is divided into central and peripheral divisions.

The central nervous system consists of the brain and spinal cord. The nerves with their numerous ramifications and plexuses originating from them form the peripheral nervous system. The brain contains the central levels of the vegetative nervous system localized in the diencephalon and the hypothalamus. Moreover, the vegetative system has ganglions, plexuses and fibres (this is treated in greater detail on pages 47-50).

The spinal cord is situated in the spinal canal. It is shorter than the spinal column, and extends from the medulla oblongata and ends at the level of the first or second lumbar vertebra. The spinal cord is covered by three membranes—dura, arachnoid and vascular membrane; the space between them is filled with cerebrospinal fluid. The space between the vascular and arachnoid membranes is called the subarachnoid space. Anterior and posterior nerve roots emerge and run sideways from each half of the spinal cord. The anatomical connections of the nerve roots with the spinal cord become clear on examination of its transverse section (Fig. 2). A transverse section of the spinal cord shows grey matter (an accumulation of nerve

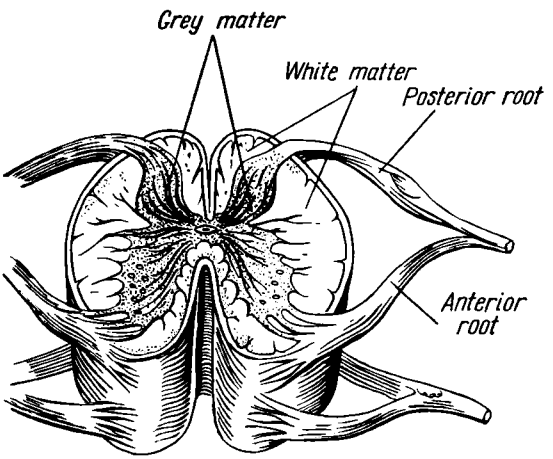

Fig. 2. Transverse section of the spinal cord

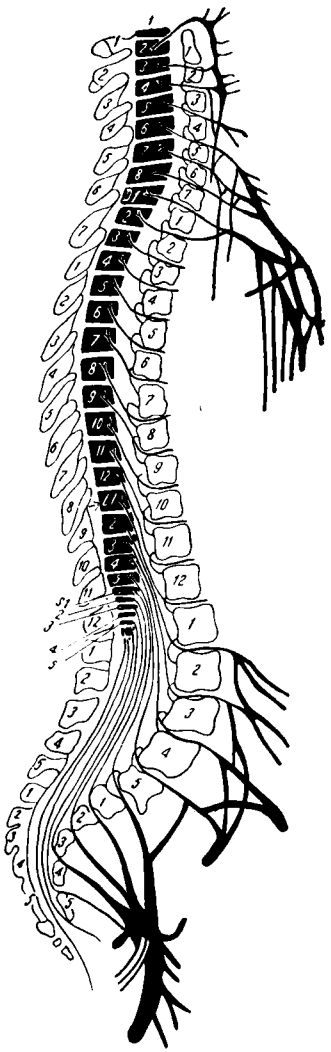

Fig. 3. Topographic relations between the segments of the spinal cord and the vertebrae

cells) surrounded by white matter (an accumulation of nerve fibres) in which anterior, lateral and posterior columns are distinguished.

The grey matter has a characteristic arrangement and looks like a butterfly with its wings spread or like the letter H. Anterior, posterior and lateral horns (cornua) can be distinguished in it. In the centre of the grey matter there is the central longitudinal canal. The two halves of the grey matter are connected by a grey commissure. The anterior horns from which anterior motor roots emerge are motor horns; the posterior horns to which nerve fibres forming the posterior or sensory roots extend are sensory horns. The lateral horns well marked in the thoracic and lumbar parts contain cells of the sympathetic nervous system. Perforating the dura mater the anterior and posterior roots emerge into the intervertebral foramens where, uniting, they form a mixed (sensory and motor) spinal nerve, the posterior root forming a spinal ganglion at the site of the junction. A total of 31 pairs of such nerves emerge from the spinal cord. Since the spinal cord is shorter than the spinal canal the nerve roots emerging from the sides are not arranged strictly horizontally all along the spinal cord; in its upper parts they run horizontally, but on approaching the lower part they run increasingly more downward, finally taking a vertical direction and forming the cauda equina (so called because of its resemblance to a horse's tail). The nerves emerging beyond the spine form plexuses

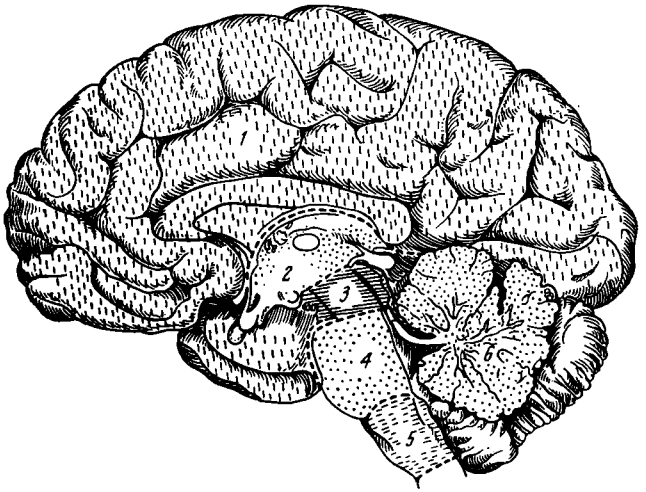

Fig. 4. Longitudinal section of the human brain
1—prosencephalon; *2*—diencephalon; *3*—mesencephalon; *4*—pons; *5*—medulla oblongata; *6*—cerebellum

(cervical, brachial, lumbosacral) from which the nerves run to the muscles and skin of the extremities, trunk, etc.

A portion of grey matter of the spinal cord with two pairs of anterior and posterior roots forms a segment of the spinal cord. There is a total of 31 segments (Fig. 3): 8 cervical, 12 thoracic, 5 lumbar, 5 sacral and 1 coccygeal. The various segments of the spinal cord innervate certain portions of the skin and muscles. The following relations exist between the segments and the muscles: cervical segments *1-4* innervate the muscles of the neck, cervical segments *5-8* and thoracic segments *1-2* innervate the muscles of the upper extremities, thoracic segments *3-12* and lumbar segment *1* innervate the muscles of the trunk, lumbar segments *2-5* and sacral segments *1-2* innervate the muscles of the lower extremities, sacral segments *3-5* and the coccygeal segment innervate the perineal muscles and the urogenital organs.

The brain consists of: (1) two hemispheres connected by a commissure (corpus callosum), (2) the diencephalon (it includes the thalamus and the hypothalamus), (*3*) the mesencephalon (corpora quadrigemina or quadrigeminal bodies, and cerebral peduncles), (*4*) the metencephalon (giving rise to the cerebellum and the pons), and (*5*) the medulla oblongata (Fig. 4). The brain is located in the cranium and is covered, like the spinal

cord, by three membranes. It is convex externally and flattened at the base.

The brain of an adult weighs an average of 1300-1350 g. The cerebral hemispheres have cavities—lateral ventricles which communicate through the third ventricle with each other and with all other cavities of the brain and spinal cord. The ventricles are filled with cerebrospinal fluid.

Cranial nerves give off from the base of the brain (Fig. 5). Most of them arise from nuclei (accumulations of nerve cells) located in various parts of the brain stem, mainly in the medulla oblongata, and constitute motor, sensory and mixed nerves. The following 12 pairs of cranial nerves are distinguished: 1st pair—olfactory, 2nd pair—optic (at the base of the brain the optic nerves form an incomplete decussation, the so-called

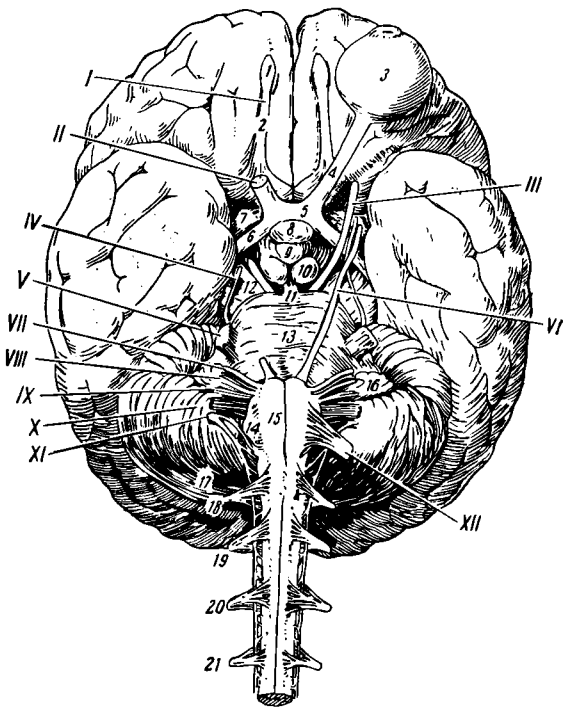

Fig. 5. Base (lower surface) of the brain

1—olfactory bulb; *2*—olfactory tract; *3*—eyeball; *4*—optic nerve; *5*—optic chiasm; *6*—optic tract; *7*—olfactory trigone; *8*—hypophysis; *9*—tuber cinereum; *10*—mammillary body; *11*—interpeduncular fossa; *12*—cerebral peduncle; *13*—pons; *14*—olive; *15*—pyramid· *16*—brachium pontis; *17*—cerebellum; *18, 19, 20* and *21*—superior spinal nerves; I—XII—cranial nerves

optic chiasm), 3rd pair—oculomotor, 4th pair—trochlear, 6th pair—abducens. The last three pairs are purely motor nerves; they run to the muscles of the eyeballs and ensure their movements. The 3rd pair contains parasympathetic fibres which effect the pupillary reflex and accommodation of the eyes. The 5th pair—trigeminal, the thickest of the cranial nerves (each nerve consists of 3 branches)—contains motor and sensory fibres, the sensory fibres running to the skin of the face and the motor fibres to the masticatory muscles. The 7th pair—facial—runs to the muscles of the face and ensures all movements of the mimetic muscles. The facial nerve is joined by the intermediate nerve which contains gustatory fibres and parasympathetic fibres innervating the lacrimal and salivary glands. The 8th pair—acoustic. In the internal auditory meatus the acoustic nerve divides into the cochlear nerve (acoustic proper) and vestibular nerve (nerve of balance). The 9th pair—glossopharyngeal—has fibres running to the pharynx. Gustatory stimuli from the grooved papillae of the tongue are transmitted through the glossopharyngeal nerve to the brain. The nerve contains parasympathetic fibres running to the parotid gland. The 10th pair—vagus—contains sensory and motor parasympathetic fibres. The vagi are the longest of the cranial nerves, their fibres running to a number of organs—pharynx, esophagus, larynx, heart, lungs, stomach, etc. The 11th pair—accessory—originates in the grey matter of the medulla oblongata and the spinal cord from where its fibres ascend to the cranial cavity and then descend. This nerve innervates the sternocleidomastoid and the trapezius muscles. The 12th pair—hypoglossal—innervates the muscles of the tongue.

The mesencephalon, pons and medulla oblongata are united under the common designation of the brain stem.

The following is a brief description of the anatomy of the aforementioned parts of the brain.

The medulla oblongata is located on the clivus blumenbachii in the cranial cavity. Its lower portion extends directly into the spinal cord. On its anterior surface it has a longitudinal fissure with two oval eminences on its sides—the pyramids and olives. On its posterior surface it has a longitudinal furrow and two posterior cords—continuations of the posterior columns of the spinal cord.

The medulla oblongata contains grey and white matter. The grey matter which is an accumulation of nerve cells (nuclei of the medulla oblongata) is inside and the white matter (conduction pathways) is on the outside.

The metencephalon (pons and cerebellum). The pons is situat-

ed above the medulla oblongata in the form of an eminence. The lateral parts of the pons gradually grow narrower and go under the cerebellum; they are the middle cerebellar peduncles joining the pons and the cerebellum. On the anterior surface of the pons there are bundles of nerve fibres running to the cerebrum and extending into the cerebral peduncles. Within the pons, as in the medulla oblongata, there are nuclei most of which give rise to the aforementioned cranial nerves. The medulla oblongata and pons also contain parasympathetic nuclei which regulate salivation and important vital functions (cardiovascular and respiratory centres).

The cerebellum consists of two lateral lobes connected by the so-called vermis. By means of three pairs of peduncles (superior, middle and inferior) the cerebellum is connected with the mesencephalon, the pons and the medulla oblongata. The cerebellum consists of external grey matter (its cortex) and internal white matter. The latter contains the cerebellar nuclei, for example, the dentate nucleus.

The upper part of the medulla oblongata, its posterior wall, takes part in forming the fourth ventricle, the floor of which is the rhomboid fossa. The fourth ventricle communicates with the central canal of the spinal cord and the subarachnoid space.

The mesencephalon (cerebral peduncles and corpora quadrigemina). The cerebral peduncles are an accumulation of nerve fibres forming two thick bundles of nerves. By means of these peduncles the medulla oblongata and the pons communicate with the higher parts of the brain. The peduncles consist of a base and a tegmentum with the substantia nigra in between. Moreover, they contain red nuclei and the nuclei of the 3rd and 4th pairs of cranial nerves. Next to the nucleus of the 3rd pair of cranial nerves is the parasympathetic Edinger-Westphal nucleus which effects the pupillary reflex and accommodation of the eyes. The substantia nigra, the red nucleus, the dentate nucleus of the cerebellum and the corpus striatum of the cerebral hemispheres belong to the extrapyramidal system.

The corpora quadrigemina have the form of a plate with four small round eminences (colliculi)—two superior and two inferior. Between the superior colliculi is the epiphysis cerebri (pineal body). The superior colliculi contain accumulations of nerve cells which functionally belong to the subcortical visual centres; the nerve cells in the inferior colliculi are subcortical auditory centres.

The diencephalon (includes the thalamus and the hypothalamus). The thalamus is two large structures consisting of grey matter. Between the internal surfaces of the thalamus is the

third ventricle which communicates with the fourth ventricle through the aqueduct of Sylvius and with the lateral ventricles through the interventricular foramens. The thalamus is the sensory centre of the whole body and contains the primary visual centres. All sensory conductors reach the thalamus and the latter is therefore considered to be the main relay centre for sensory impulses to the cerebral cortex.

The hypothalamus is located below the thalamus. Its main structures are the tuber cinereum and mammillary bodies containing nuclei which exert control over regulation of metabolic processes, water balance, temperature, sleep, etc. (subcortical vegetative centres).

The cerebral hemispheres consist of grey and white matter. The grey matter of the hemispheres is the outer thin layer and is known as the cerebral cortex. The bulk of the hemispheres consists of white matter located under the cortex. Within the hemispheres there are accumulations of grey matter in the form of various ganglions, the chief of which are the caudate and lenticular nuclei known under the common name of corpus striatum, and the thalamus. The narrow layer of white substance between the subcortical ganglions is the internal capsule (Fig. 6).

Numerous folds separated from each other by fissures are clearly seen on the surface of the cerebral cortex. A portion of cerebral cortex between two fissures is called the gyrus. The gyri differ widely in size and shape. The thickness of the cerebral cortex of a human adult is not uniform and averages 4 mm.

Owing to the numerous folds the entire surface of the cortex measures an average of 2250 sq cm. The cerebral hemispheres are divided into frontal, parietal, temporal and occipital lobes. The location of the lobes approximately corresponds to the cranial bones. The borders between the lobes are most constant and clearly marked fissures. For example, the Sylvian fissure which runs along the outer surface of the hemisphere anteroposteriorly and somewhat upward separates the temporal lobe from the frontal and parietal lobes, the central sulcus situated about the middle of the brain separates the frontal from the parietal lobe, etc. Each of the lobes is in its turn divided into gyri by fissures. For example, the outer surface of the temporal lobe is divided by two horizontal fissures into three gyri—superior, middle and inferior. The bulk of the cerebral hemispheres consists of white matter—an accumulation of an enormous number of nerve fibres. By means of these fibres the cerebral cortex communicates with all other parts of the central nervous system and the periphery, the cerebral hemi-

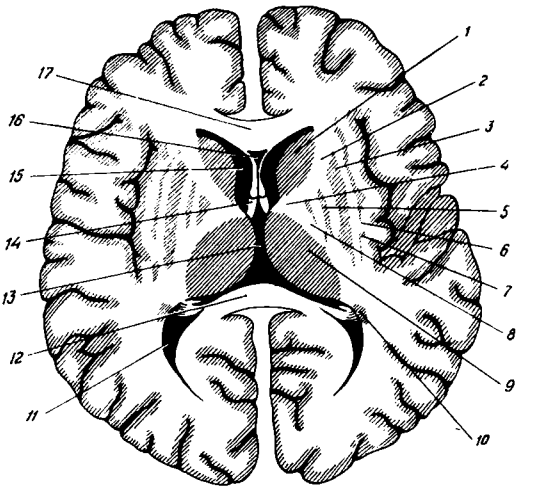

Fig. 6. Horizontal section of the brain

1 and *10*—caudate nucleus; *2*, *4* and *8*—internal capsule; *3*—putamen; *5*—globus pallidus; *6* and *7*—claustrum; *9*—optic thalamus; *11* and *15*—lateral ventricles; *13*—third ventricle; *12* and *17*—corpus callosum; *14*—callosal peduncle; *16*—septum pellucidum

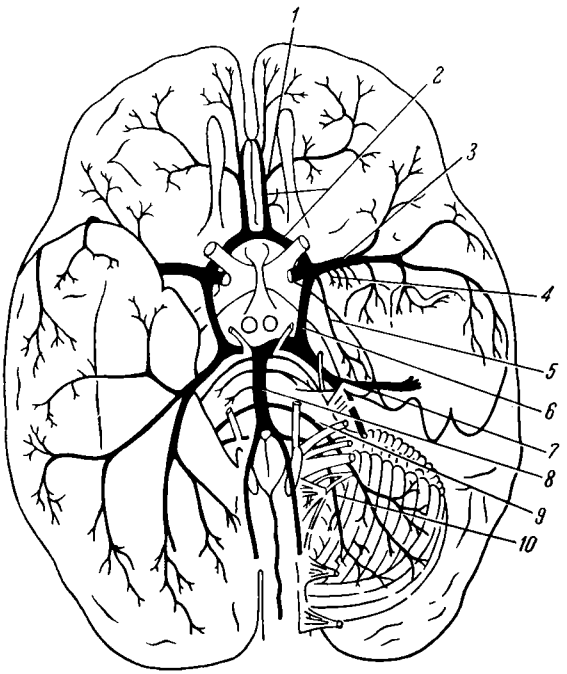

Fig. 7. Arteries of the base of the brain

1—anterior cerebral; *2*—anterior communicating; *3*—middle cerebral; *4*—subcortical; *5*—artery to choroid plexus; *6*—posterior communicating; *7*—posterior cerebral; *8*—basilar; *9*—middle cerebellar; *10*—inferior cerebellar (cerebellum on the left has been removed)

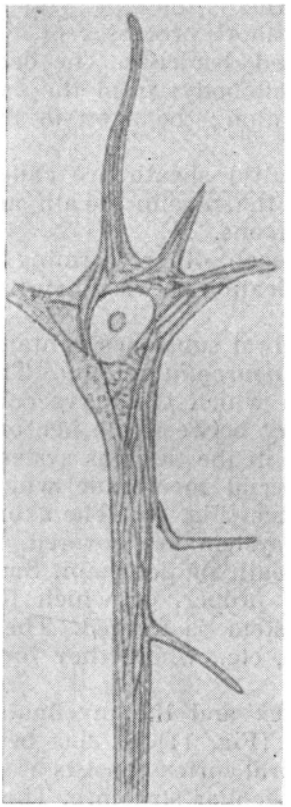

Fig. 8. Cortical nerve cell

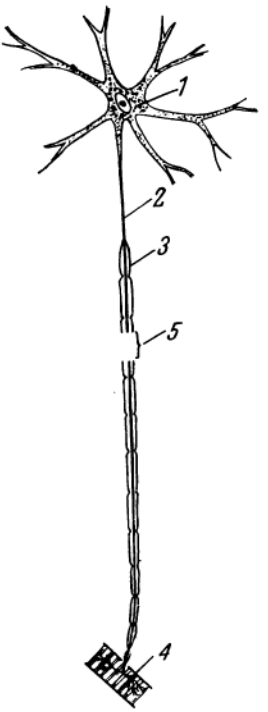

Fig. 9. Schematic representation of a neuron

1—nerve cell with muscles; *2*—axon; *3*—myelin sheath covering axon; *4*—terminal ramification of axon in a muscle fibre; *5*—interruption in the representation of axon; an axon is hundreds of times as large as a nerve cell

spheres communicate with each other, and connections within each hemisphere are maintained.

The brain is supplied with blood by the internal carotid and vertebral arteries (Fig. 7). The arterial anastomosis at the base of the brain forms the circle of Willis.

Examination of cerebral tissue under the microscope reveals that it consists of an enormous number of nerve cells (neurons) and neuroglia.

A nerve cell or *neuron* consists of a cell body and numerous processes (Fig. 8). Like any other cell it has protoplasm, a nucleus and a nucleolus. Very fine fibrils—neurofibrils—inherent

only in this cell run all through the cell body and its processes. Of the numerous processes of the nerve cell one long process emerging from its base is distinguished; this is the axis-cylinder process, neurite or axon (Fig. 9). The short processes of the nerve cell branched like a tree are called dendrites. The dendrites carry the nerve impulse to the cell body; from the cell body the nerve impulse is transmitted along the axon to the periphery.

The axons covered by the myelin (fatty) sheath are called medullated (myelinated), those without the myelin sheath are called non-medullated (non-myelinated) axons.

The nerve cells communicate with each other, forming a chain of neurons. The regions of communication between neurons are called synapses.

In addition to the nerve cells the cerebral substance contains a special interstitial tissue—so-called *neuroglia* or *glia*. The neuroglia is the supporting structure in which the nerve cells are located. Moreover, as an intermediary between the neurons and blood vessels it ensures metabolism in the nervous system.

Nerve fibres are covered with a special membrane which consists of myelin—a white fatty substance (Fig. 10). The axons extending beyond the central nervous system are covered, in addition to a myelin sheath, with a sheath of Schwann. Such nerve fibres are the peripheral nerves proper, of which the peripheral division of the nervous system is formed. These nerves run to muscles, the skin, glands, etc., where they form special nerve endings.

The nerve cells of the cerebral cortex and the myelinated fibres are arranged in a definite order (Fig. 11). It has been established that almost all of man's cerebral cortex consists of six layers. Each layer is noted for its own peculiar structure. These layers are as follows: (*1*) molecular (superficial), (*2*) external granular, (*3*) pyramidal, (*4*) internal granular, (*5*) ganglionic, and (*6*) polymorphous. Various portions of the cortex have their own structure which is manifested in predominance of a particular layer, number and density of cells. For example, the layer of large pyramidal cells is predominantly developed in the motor zone, in the region of the anterior central gyrus. Studies of the structural characteristics of various parts of the cerebral cortex (cytoarchitectonic investigations) have led to the discovery of 47 different cortical fields. These differences in the structure of the different areas of the cerebral cortex are to be attributed to the multifarious functions of the brain.

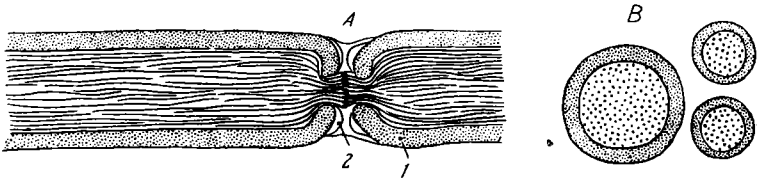

Fig. 10. Myelinated nerve fibre

A—longitudinal section, *B*—transverse section
1—myelin sheath; 2—sheath of Schwann

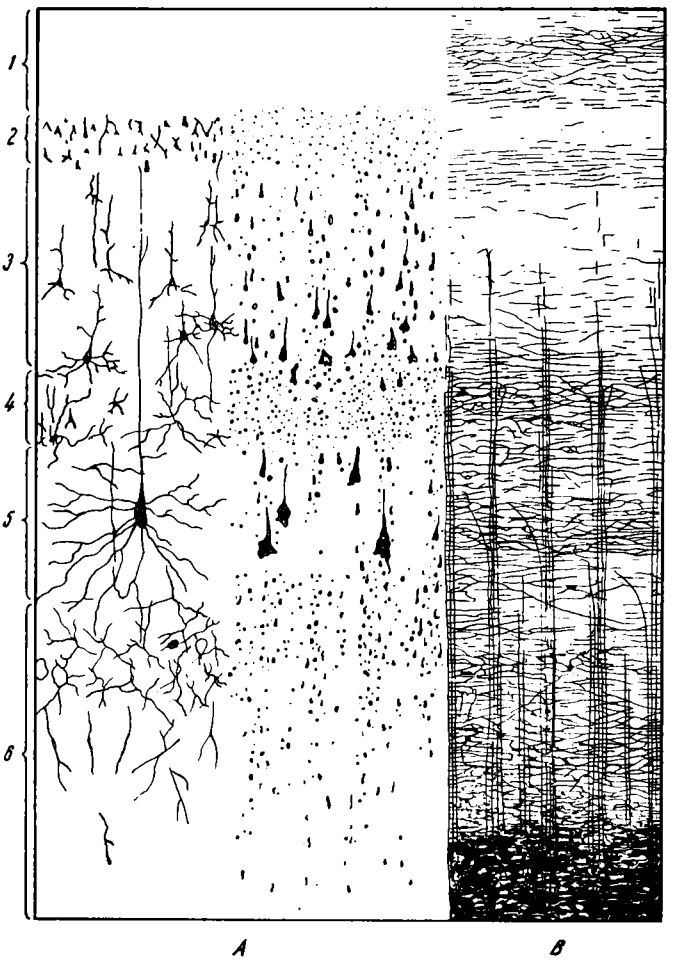

Fig. 11. Structure of the cerebral cortex (diagram)

A—arrangement of nerve cells (Figs. *1*, *2*, *3*, *4*, *5* and *6* indicate six layers of cells); *B*—arrangement of nerve fibres

FUNDAMENTALS OF NORMAL AND PATHOLOGIC PHYSIOLOGY OF THE NERVOUS SYSTEM

All higher nervous activity is of a reflex nature.

A reflex is a response reaction of the central nervous system to a stimulus. It follows that the various stimuli in the external environment—auditory, visual, mechanical, thermal, olfactory, gustatory, etc., as well as the impulses originating in the internal environment of the organism (internal organs, muscles, joints, etc.) continuously affect the receptor nervous apparatus. The resultant nervous excitation is transmitted along nervous conductors to the central nervous system whence the nerve impulse is directed along other conductors to the working organ.

Spinal Cord

We shall begin by examining the segment-reflex function of the spinal cord. Fig. 12 shows a simple diagram of the spinal reflex arc. If we prick the skin of the hand, the pain stimulus received by the nerve ending—receptor—will travel along a sensory nerve to the spinal cord. Through a posterior root of the spinal cord the nerve impulse will reach the nerve cells of a

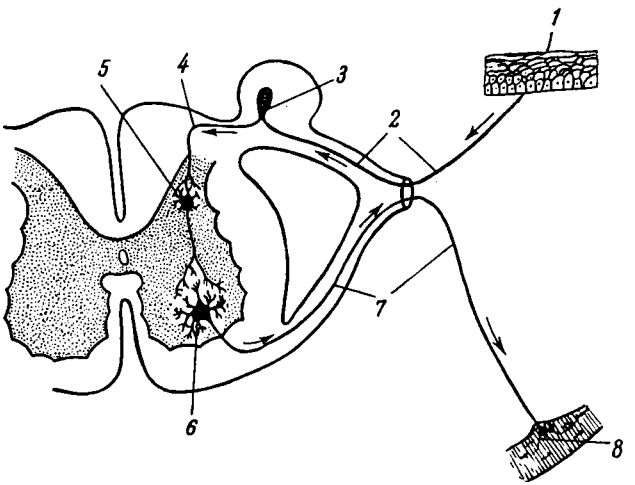

Fig. 12. Diagram of reflex arc

1—cutaneous receptor (ending of sensory nerve fibre in the skin); *2*—sensory fibre (peripheral process of a sensory nerve cell); *3*—sensory cell (in a nervous ganglion); *4*—central process of a sensory cell; *5*—interneuron (in the spinal cord); *6*—motor nerve cell (in the spinal cord); *7*—motor nerve fibre; *8*—nerve ending in a muscle

posterior horn whence the stimulus will extend to the dendrites of the nerve cells of an anterior horn (motor cells). Through an anterior root the impulse will travel to the muscles of the hand and cause them to contract with the result that the hand will be reflexly jerked away. The tendon reflexes, the reflexes from the conjunctiva, etc., have the same physiologic mechanisms.

Reflexes are divided into unconditioned (inborn) and conditioned (acquired). The main part in forming conditioned reflexes in man is played by the cerebral cortex. Unconditioned reflexes are effected in the lower parts of the nervous system—the spinal cord, brain stem and subcortical ganglions.

The aforedescribed spinal reflex may arise only if all parts of the reflex arc are intact. No reflex reaction will occur if any part of the reflex arc is impaired.

The following main groups of disorders of the segment-reflex and conduction function of the spinal cord may be observed in cases of injury to the spinal cord, according to the site and character of the injury:

1. *Segmental Motor Disorders.* These disorders arise in cases of injury to an anterior horn or an anterior root. In these cases symptoms of peripheral paralysis are observed at the level of muscles innervated by a particular segment. Absence of reflexes (areflexia), a sharp diminution in muscle tone (atonia) and a wasting of the muscles (atrophy) are the characteristic signs of such paralysis. Similar paralysis is observed in cases of injury to peripheral nerves.

2. *Segmental Sensory Disorders.* These disorders result from injury to a posterior horn or a posterior root. These cases are marked by complete loss of sensation (anesthesia) or diminution in all forms of sensitivity (hypesthesia) in certain segments, as well as diminution in or complete absence of reflexes (tendon, cutaneous, etc.).

The second basic function of the spinal cord is conduction which is performed by a system of ascending and descending conduction pathways. The bulk of these conduction pathways is represented by the anterior, posterior and lateral columns (or tracts) of the spinal cord. The fibres of all descending conductors end at the cells of the anterior spinal horns. Both excitatory and inhibitory impulses travel through the descending conductors. For example, in case of a prick of a pin man may not jerk his hand away if the unconditioned reflex is inhibited.

Injury to the spinal conduction systems is followed by more extensive functional disturbances than is injury to individual

segments. For example, in cases of injury to the lateral columns of the spinal cord (pyramidal motor fibres) paralysis of a central character affects the muscles innervated by segments below the site of injury (see page 42). If the pathologic focus is localized in the lateral columns of the cervical part of the spinal cord, it will paralyse the arms and legs. The same thing is observed in cases of injury to sensory pathways, i.e., the sensitivity disturbances are of a conduction type.

With knowledge of the localization of conduction pathways in the spinal cord and their functions a neuropathologist establishes the site of injury in the spinal cord by the observable symptoms.

The centres of urination and defecation are localized in the grey matter of the spinal cord at the level of the 3rd, 4th and 5th sacral segments. The activity of these centres, like that of the rest of the spinal cord, is in certain measure regulated and controlled by the cerebral cortex. Injury to these centres may result in various disorders of urination and defecation, for example, a disturbance in voluntary urination or retention of urine (this phenomenon not infrequently occurs during the first days following complete transverse injury to the spinal cord).

The spinal vegetative centres are localized in the lateral horns of the spinal cord. Pathologic changes in these horns may lead to a number of vegetative and trophic disorders—disturbances in perspiration and blood supply, changes in the skin, nails, etc.

Brain

The great physiologists I. Sechenov and I. Pavlov have demonstrated by their investigations that the activity of the higher parts of the nervous system (cerebral cortex), like that of its other parts, is of a reflex nature. But there is a difference between the reflexes formed without the participation of the cerebral cortex and those whose path runs through the cortex. Only unconditioned reflexes are effected without the participation of the cortex; they exist from birth and are characterized by constancy. These reflexes include the sucking reflex, the lacrimal reflex in response to irritation of the corneal conjunctiva, etc. The instincts—food, sexual, mother and self-preservation—are also complex unconditioned reflexes.

By means of unconditioned reflexes the animals are capable only of a coarse and limited adaptation to their environment.

Conditioned reflexes are formed on the basis of unconditioned or firmly elaborated conditioned reflexes. These reflexes are

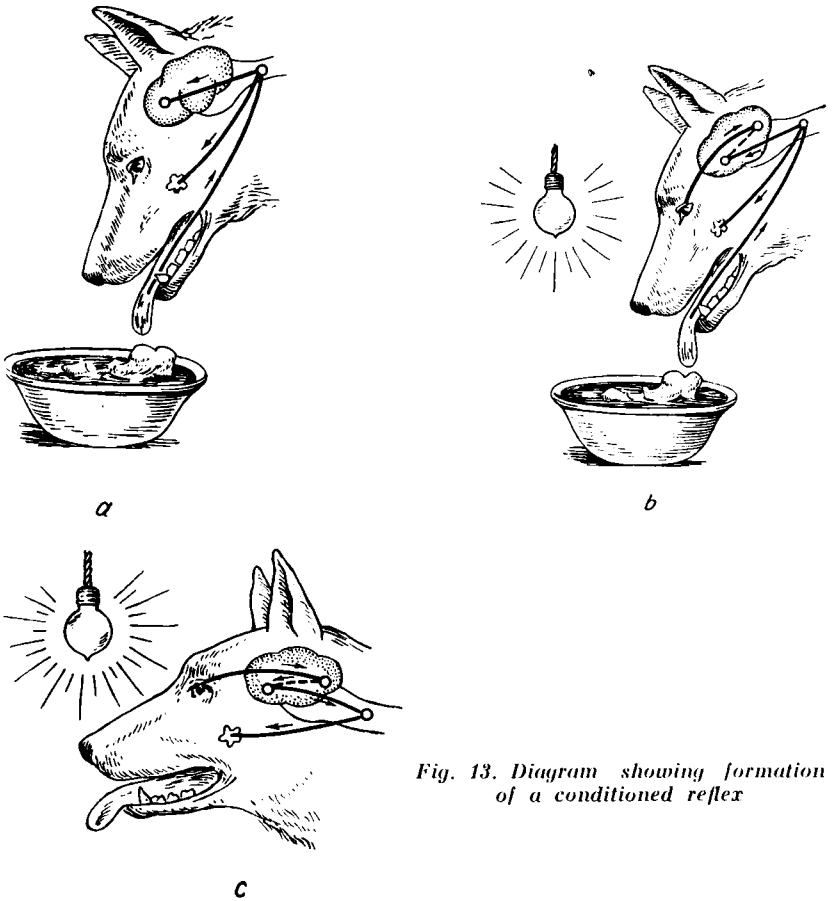

Fig. 13. Diagram showing formation of a conditioned reflex

called conditioned because their formation requires definite conditions, reinforcement of a conditioned stimulus by an unconditioned stimulus. The following is an example of elaboration of a conditioned reflex (Fig. 13). A dog is placed in a special stand. A salivary duct (fistula) is brought from its salivary gland to the exterior. When the dog is given food saliva begins to drop into a test tube. This is an unconditioned reflex. In this case stimulation of the oral cavity by food stimulates the centre of salivation. A light is periodically flashed in the room not far from the dog. The dog reacts to it by pricking up its ears and turning its head towards it. Several seconds after the flashing of the light the dog is given food and is observed to salivate.

If this combination (light-food) is repeated several times, it is subsequently enough to flash the light in order to evoke increased salivation. It follows that a conditioned food reflex has formed to the light. In this case the light has become a conditioned stimulus, i.e., a signal of feeding, for the dog. Thus, we see that a conditioned reflex is but a response reaction to such a stimulus which of itself is of no particular importance to the organism, but is a signal of vitally important environmental phenomena.

Conditioned reflexes are temporary connections with the external environment. By means of these reflexes the organism adapts itself to the changing conditions of the external environment. As long as the organism lives new conditioned reflexes are continuously elaborated. The old conditioned reflexes (temporary connections) are extinguished, if they are not reinforced. If former conditions are reproduced the extinguished reflexes may revive. In the final analysis all of man's activity, all of his behaviour is the result of the combination and interaction of innumerable conditioned reflexes of the most diverse complexity and of the existence of a number of unconditioned reflexes and instincts.

To receive stimuli the nervous system is equipped with special apparatus which I. Pavlov named analysers. The following analysers are distinguished: cutaneous, auditory, visual, olfactory, gustatory and motor.

In addition to the analysing activity and simultaneously with it the cerebral cortex synthesizes (generalizes, unifies) the nervous processes operating in the different parts of the nervous system. Formation of conditioned reflexes is possible only because of the synthesizing activity of the cerebral cortex.

The balancing of the organism with the external environment is based on interaction of the two basic processes of the nervous system—excitation and inhibition.

The foregoing example of elaboration of a conditioned reflex in response to a stimulus—flashing of a light—showed that *a process of excitation* arose in the dog's cerebral cortex and that this process conditioned the positive response reaction—salivation. But if the light is flashed several times in succession and the dog is not given any food the salivation in response to the light will finally cease. Pavlov explained this phenomenon as extinction of the conditioned food reflex *based on the process of inhibition* in the nerve cells. The inhibition of the previously elaborated conditioned reflex occurs under the influence of the altered environment. It follows that the process of excitation in nerve cells evokes or increases the activity of organs, whereas

the process of inhibition weakens or even completely terminates it. The same two processes in the main regulate the activity of the lower structures—subcortical ganglions, brain stem and spinal cord—which are subordinate to the cerebral cortex, and thus ensure the finest analysis of all surrounding phenomena.

I. Pavlov proved that the processes of excitation and inhibition are governed by laws of *irradiation, concentration* and *induction.* If excitation or inhibition arising at some part of the cerebral cortex spreads to adjacent parts it is said to irradiate. If the process of excitation or inhibition concentrates on a certain portion of the cortex it is referred to as concentration of the nervous process. The following experiment will serve as an example of irradiation and concentration of nervous processes.

A conditioned food reflex is elaborated in the dog to a tuning fork of a certain tone. In the beginning a positive reaction is also evoked by the sound of the tuning fork of other tones. But subsequently, on reinforcement of the conditioned reflex (feeding) the sound of tuning forks of other tones fails to evoke the conditioned reflex reaction.

It follows that in the beginning of the experiment we had the process of irradiation and subsequently concentration of the nervous process.

In addition to irradiation and concentration of the nervous processes, nervous activity is characterized by *processes of mutual induction* of both excitation and inhibition. For example, if inhibition sets in some part of the cerebral cortex, the process of excitation arises, according to the law of induction, in other, adjacent portions of the cortex. Contrariwise, the process of excitation will cause inhibition in adjacent areas. Intensification of the process of excitation under the influence of inhibition is called *positive induction.*

Intensification of the process of inhibition under the influence of excitation is called *negative induction.* Development of irradiation or induction depends on the strength of the nervous process.

It follows from the above that, owing to a large number of various stimuli there is a continuous interplay of processes of excitation and inhibition, irradiation and concentration of these basic processes, as well as positive and negative induction taking place in the brain all the time. As I. Pavlov said, all these physiologic processes form in the cortex of the waking man a "functional mosaic" which continuously changes because the basic processes intensify or weaken, extend from one part of the brain to another, etc. Nevertheless, we see, as a result of this

activity, very orderly, integral reactions of the organism to external stimuli. This is due to the fact that the nervous processes operate in the cerebral cortex in accordance with a certain system based on *stereotypical* (very frequently repeated) *nervous* processes forming as a result of the activity of the nervous system.

Analysers

Cutaneous Analyser

Man's skin is abundantly supplied with various sensory nerve endings intended for receiving different external stimuli (pain, heat, cold, pressure, contact, etc.).

After application of a pain stimulus to the skin the nerve impulse travels from the sensory nerve endings in the skin along a nerve trunk to the intervertebral spinal ganglion. From the cells of this ganglion the impulse reaches the cells of the posterior horn along the fibres of the posterior root. The axons of the cells of the posterior horn run through the anterior grey commissure of the spinal cord to the opposite side where they enter the lateral column of the spinal cord and, as part of the spinothalamic tract, reach the cells of the optic thalamus. From the optic thalamus the fibres ascend through the internal capsule to the posterior central gyrus, the localization of the cortical sensory cells which are the central (cortical) end of the given analyser. Here in the cortex the impulses coming from the periphery are analysed and synthesized. The sensation of pain, temperature, etc., may be normal only provided the entire tract is intact. Injury to any part of this tract will impair a particular form of sensitivity.

Auditory Analyser

Sound waves spread through the air from a sounding object and upon reaching the eardrum (tympanic membrane) produce vibrations in it. These vibrations are transmitted through the tympanic cavity along the auditory ossicles to the membrane that closes in the fenestra rotunda (membrana tympani secundaria). The vibrations of this membrane cause vibrations in the perilymph and then in the endolymph. This sets in motion the organ of Corti, which leads to stimulation of the nerve endings in the cochlea whence the nerve impulse travels along the acoustic nerve to the pons and thence to the posterior colliculi of the corpora quadrigemina and the optic thalamus. The auditory path ends in the upper portions of the cortex of the temporal

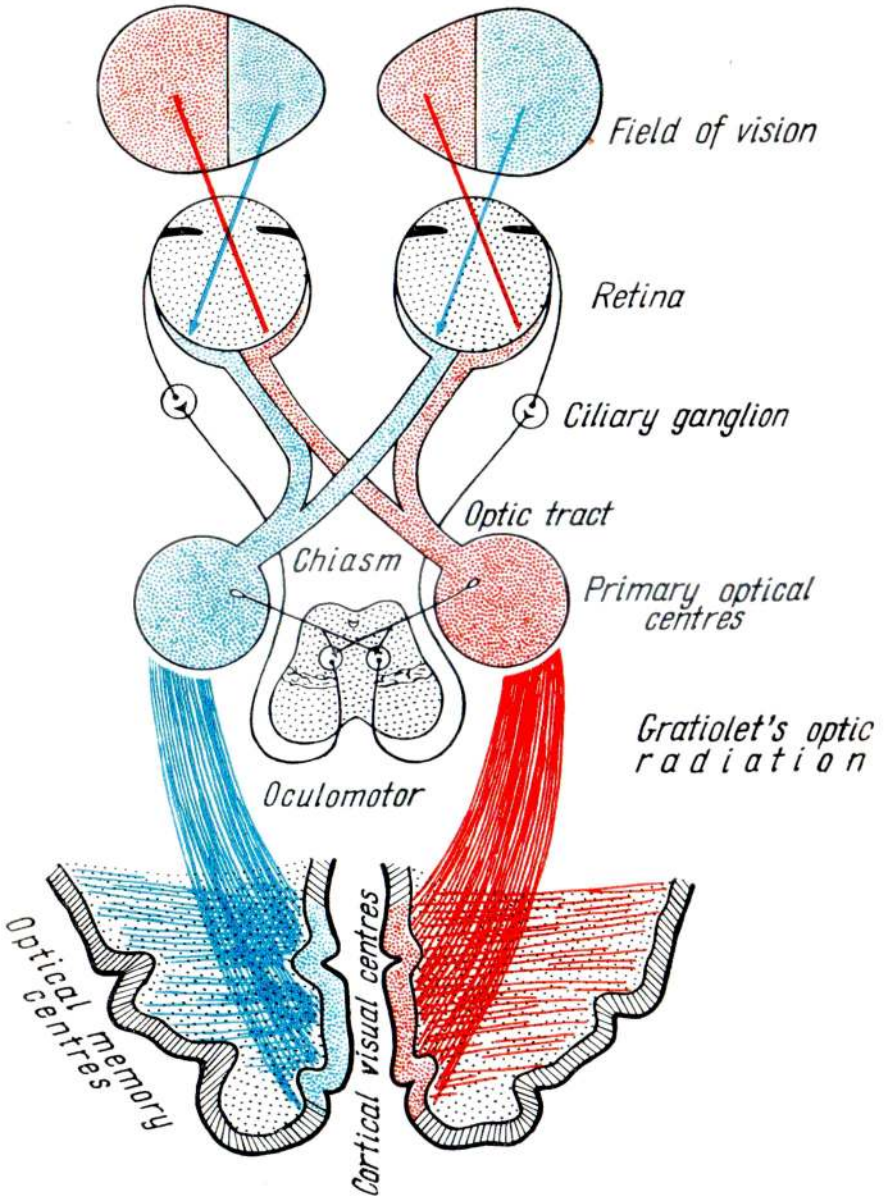

Fig. 14 Diagram of human optic tracts

lobe. The sound sensations are analysed and synthesized here in the cortical end of the analyser. Damage to any part of the auditory tract results in deafness.

Visual Analyser

On reaching the retina of the eye light waves evoke a physicochemical reaction in its rods and cones and thereby give rise to a nerve impulse. The impulse travels along the optic nerves to the anterior colliculi of the corpora quadrigemina and to the optic thalamus. It should be noted that before entering the corpora quadrigemina and optic thalamus the optic nerves undergo incomplete decussation with the result that each optic nerve includes fibres that run from the retina of the other eye (Fig. 14). From the optic thalamus the nerve fibres run through the internal capsule to the cortical cells of the occipital lobe where the central end of the visual analyser is localized in the region of the calcarine fissure.

Development of a pathologic process in any part of the optic tract will cause total or partial loss of vision.

Olfactory Analyser

The nerve cells receiving olfactory stimuli are localized in the mucous membrane of the upper parts of the nasal cavity whence their axons run to the olfactory bulbs in the cranial cavity and thence nerve fibres run to the cells of the olfactory analyser localized in the temporal lobe (internal surface).

Gustatory Analyser

This analyser originates in the nerve endings of the taste buds which are localized in the numerous papillae covering the tongue. The nerve fibres emerging from the taste buds run to the brain and, like the nerves of the olfactory analyser, end on the internal surface of the temporal lobe.

Motor Analyser

The main tract in the system of the motor analyser are the *corticospinal* or *pyramidal tract*. It is known as corticospinal because it connects the cerebral cortex with the spinal cord. It begins from the pyramidal cells of the anterior central gyrus

of the cerebral cortex. The uppermost parts of this gyrus contain cells which take part in innervating the muscles of the legs; below is the region which ensures the movements of the trunk and arms; the cells which have to do with the muscles of the face, larynx, etc., are localized at the very bottom of the gyrus (Fig. 15). From here the axons of these cells descend deep into the brain and passing through the internal capsule enter the cerebral peduncles and thence the pons and medulla oblongata. At the site where the medulla oblongata extends to the spinal cord the pyramidal tract undergoes decussation so that the nerve fibres go from the left hemisphere to the right and from the right hemisphere to the left. After this decussation the fibres in the main run into the lateral columns of the spinal cord and thence reach the nerve cells of the anterior spinal horns (Fig. 16).

From the anterior horns the nerve fibres run in the anterior root, emerge from the spinal cord and proceed to the muscles of the trunk and extremities (peripheral nerve fibres). Thus, we see that the corticospinal (pyramidal) tract has a two-neuron structure, the first—central—neuron originating in the pyramidal cells (giant pyramidal cells of Bets) of the cerebral cortex, and the second—peripheral—in the cells of the anterior spinal horns.

An important part in the system of the motor analyser is played by the pathways along which sensory impulses from the joints, ligaments, tendons and joint capsules travel to the cerebral cortex (to the central end of the motor analyser) and signal the state of the muscles, position of the trunk, extremities. Complex, purposeful, voluntary movements may be performed only if the motor and sensory impulses transmitted from the periphery are received by the cerebral cortex. It is only thus that man can get a correct idea of the position of his extremities.

Injury to the corticospinal tract gives rise to various disorders. If the tract is severed anywhere between the cerebral cortex and the anterior horns (motor zone of the cerebral cortex, internal capsule, cerebral peduncle, pons, medulla oblongata, lateral columns of the spinal cord) a picture of so-called central paralysis develops.

Central or *spastic paralysis* is, unlike peripheral (flaccid) paralysis, characterized by considerably increased tone of the paralysed muscles (hence, the designation of spastic), sharply intensified tendon reflexes and appearance of very characteristic pathologic reflexes—Babinski, Oppenheim, Rossolimo, Zhukovsky and other reflexes.

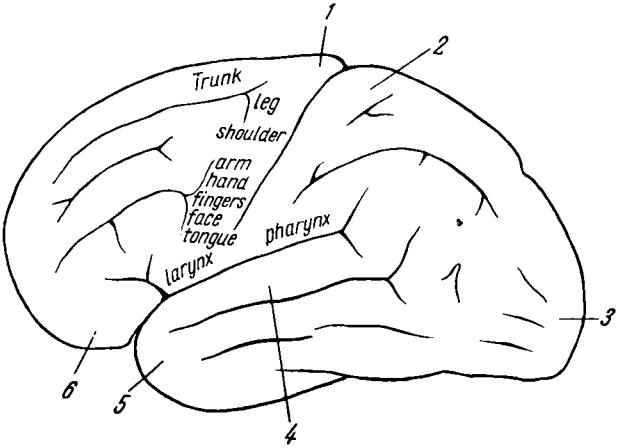

Fig. 15. Diagram of a cerebral hemisphere showing areas of the cerebral cortex according to functions

1—motor area; *2*—sensory area (thermal, pain, tactile sensations); *3*—visual area; *4*—auditory area; *5*—gustatory area; *6*—olfactory area

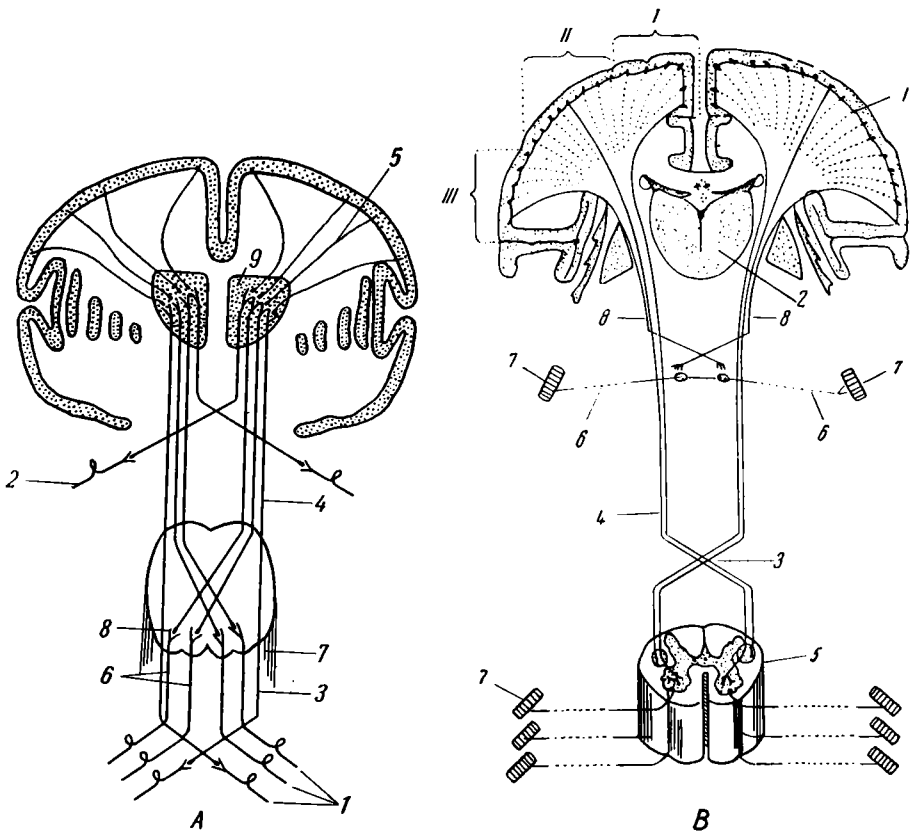

Fig. 16. Diagram of motor conduction pathways

I, II and *III*—motor area of the cortex; *1*—cerebral cortex; *2*—optic thalamus; *3*—pyramidal decussation; *4*—pyramidal tract; *5*—portion of spinal cord; *6*—cranial motor nerve; *7*—muscles; *8*—corticonuclear tract

The Babinski's reflex (Fig. 17*b*) is evoked by stroking the sole of the foot with a pin or matchstick, usually from the heel to the toes. In a patient affected with central paralysis this stimulation will cause extension of the great toe and flexion of the other toes, whereas in a healthy person it will evoke flexion of all toes, i.e., a normal plantar reflex (Fig. 17*a*).

The Oppenheim's reflex is evoked by stroking downward along the medial side of the tibia; upon this stroking the great toe extends, as in the Babinski's reflex.

The foregoing pathologic symptoms in central paralysis are due to the fact that severance of the spinal motor conduction pathways interrupts the constant influence of the cerebral cortex, i.e., its control over the lower reflex apparatus in the spinal cord ceases, excitation develops in the spinal cord and the spinal reflexes are disinhibited; hence, their intensification, an increase in the muscle tone and the appearance of the pathologic reflexes which are not observed in normal adults. These reflexes may be observed in infants up to 1 year of age (before they have learned to walk) because the central parts of the motor analyser have not yet completely formed and matured.

Motor disturbances are observed in the arms or legs, or simultaneously in the arms and legs, depending on the level at which the pyramidal tracts are impaired. For example, if the lesion is in the right side of the spinal cord, at the level of the thoracic part, the result is *monoplegia*—spastic paralysis of the right leg. In the event of injury to both sides of the cervical part of the pyramidal tract the result is *tetraplegia*—paralysis of the arms and legs. Damage to both sides of the lumbar division of the spinal cord provokes *paraplegia*—paralysis of both legs. Lesions in the internal capsule (the site of the most common hemorrhages) of the right hemisphere give rise to left-

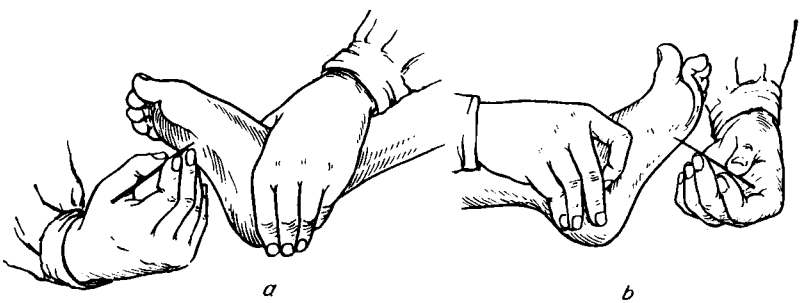

Fig. 17. Plantar reflexes
a—normal plantar reflex; *b*—Babinski's reflex

sided *hemiplegia*—paralysis of the left arm and left leg, whereas a lesion in the left hemisphere, in addition to right-sided hemiplegia, as a rule, also produces *aphasia*—speech disorders.

In hemiplegia, in addition to the paralysis of an arm and leg, the patients develop complete or incomplete paralysis (paresis) of the mimetic muscles of the lower part of the face—the corner of the mouth turning up towards the healthy side and the tongue, when protruded, moving towards the side of the paralysed extremities. These disturbances are due to the fact that among the nerve fibres of the internal capsule, in addition to those travelling from the cortex to the spinal cord, there are conductors running from the cortex to the motor nuclei of the cranial nerves located in the medulla oblongata. These are the so-called *corticobulbar tracts.* The nerve fibres of these tracts decussate at different levels of the brain stem, usually near the corresponding motor nucleus of the particular cranial nerve. The second neuron originates in the motor nucleus and runs to the corresponding muscles of the face, tongue, larynx, etc. Since the muscles of the lower part of the face and tongue are connected with the cortex only of the opposite hemisphere, i.e, have unilateral innervation, corresponding motor disturbances of the facial muscles are observed in hemiplegia—on opening the mouth its corner turns up towards the healthy side, whereas the tongue moves towards the side of the paralysed extremities.

The muscles of the upper part of the face, as well as the masticatory muscles and those of the pharynx, are connected with the cortex of both hemispheres, i.e., they have bilateral innervation—right and left—for which reason in cases of hemiplegia no disturbances in the functions of these muscles are observed. But bilateral affection of the motor area of the cortex (for example, after repeated hemorrhages) results in disorders of the functions of the masticatory, deglutitory and other muscles. These cases are marked by such symptoms as *dysarthria*—impairment of articulation, *dysphagia*—difficulty in swallowing (patients with this disorder often choke on food and drink). These disturbances are called *pseudobulbar paralyses*, as distinct from bulbar paralyses which arise in cases of direct affection of the second neuron of the corticobulbar tract, i.e., the neuron originating in the nucleus of the cranial nerve and ending in the corresponding groups of muscles. Clear atrophic changes in the paralysed muscles are observed in these cases.

In all cases of motor disorders the various forms of sensitivity—pain, tactile (sense of touch), thermal, deep—are tested to ascertain the site of the lesion. Loss of sensitivity is called

anesthesia, diminished sensitivity—*hypesthesia*, and increased sensitivity—*hyperesthesia*.

We have thus far discussed disturbances in the motor function conditioned by impairment of the conduction pathways running from the cortical motor analyser to the muscles of the trunk and limbs. In the event of a lesion near the anterior (motor) central gyrus—tumour, scar following trauma, foreign body—the irritation of the cerebral cortex may evoke peculiar attacks of motor disorders in the stage of convulsive, epileptiform seizures. Depending on the location of the lesion, these attacks may begin with twitchings of the muscles of the arm, face or leg. At first these twitchings are observed on one side, in a limited group of muscles, then they gradually increase, affecting more and more muscle groups and sometimes result in a general convulsive seizure. This is so-called *Jacksonian epilepsy* (named after John H. Jackson, English neurologist who was the first to describe it). It may be assumed that in such a seizure the wave of excitation originating at some isolated point of the cerebral cortex spreads (irradiates) to adjacent parts of the cortex and leads to a general convulsive seizure with loss of consciousness.

Peculiar motor disturbances—involuntary, sweeping motions or, on the contrary, general rigidity and slowing of all voluntary movements—may be observed in cases of lesions in subcortical ganglions (after-effects of encephalitis, tumour, chorea, etc.). In the latter case the patients walk slowly, with small steps, their arms are half-bent in the elbows, the head and trunk are inclined forward, and the face has a mask-like appearance.

Cerebellum. The cerebellum plays a very important part in the system of the motor analyser. It is connected with various parts of the central nervous system by means of three pairs of peduncles. Impulses are continuously transmitted to the cerebellum from the joints and muscles of the trunk and limbs, the eye muscles and the vestibular apparatus. These impulses signal the changes in the position of the entire body and its parts in space. In response to these signals impulses automatically run from the cerebellum to the anterior (motor) horns in the spinal cord and thence along peripheral nerves to the muscles. Besides, the cerebellum is connected with the subcortical motor centres (with the extrapyramidal system) and the cerebral cortex, mainly its frontal lobes. The large number of connections between the cerebellum and various systems attests the multiformity and complexity of cerebellar functions. The main function of the cerebellum is automatic regulation of movements; this regulation ensures the maintenance of bodily balance and precision of very complex motor acts.

The following disturbances are most commonly observed in cases of cerebellar lesions: impaired gait, so that the patient sways in walking (the gait resembles that of a drunken person), and *intention tremor*. This tremor is intensified upon voluntary movement, especially at the end of movement on reaching the goal. It is clearly marked in the *finger-nose test*; in this test the patient is asked to touch the tip of his nose with the index finger, his eyes closed; as the finger comes closer to the nose the arm begins to tremble more and the finger often misses the nose. One more pathologic symptom—cerebellar ataxia—may be revealed by the same test. The patient's hand makes several quivering movements, and the pointed finger, instead of touching the tip of the nose, hits the eye, cheek or bridge of the nose. The *heel-to-knee-to-toe* test is performed for the same purpose. The patient lying on his back is asked to close his eyes and place the heel of one foot on the opposite knee and then push the heel along the shin to the big toe. In case of cerebellar ataxia the patient will have great difficulty in performing the test.

The movements of patients with cerebellar disease are inexact, unbalanced and awkward although the muscular power is retained. Cerebellar disease is marked by low muscle tone—muscular hypotonia.

Oscillatory movements of the eyeballs are observed on abduction of the eyes and attempts to hold them in that position. This symptom is called *nystagmus*. The aforementioned motor disorders occur on the side of the lesion in the cerebellum.

Impaired speech may often be noted in diseases of cerebellar systems. The speech is slow and measured, with pauses between syllables—so-called *scanning speech*.

Brief Outline of the Vegetative Nervous System

The functions of all internal organs are regulated by the higher part of the brain—the cerebral cortex. This concept was established by I. Pavlov and subsequently developed by his pupil K. Bykov. In addition to the cortical regulation of internal organs (*corticovisceral relations*) there are also reverse relations (*viscerocortical relations*)—nerve impulses signalling the work of the internal organs are continuously transmitted from the internal organs to the cerebral cortex.

It has now been firmly established that the cerebral cortex exerts conditioned reflex influences on the functions of the internal organs. For example, by applying a conditioned reflex stimulus it is possible to increase or decrease the urinary output

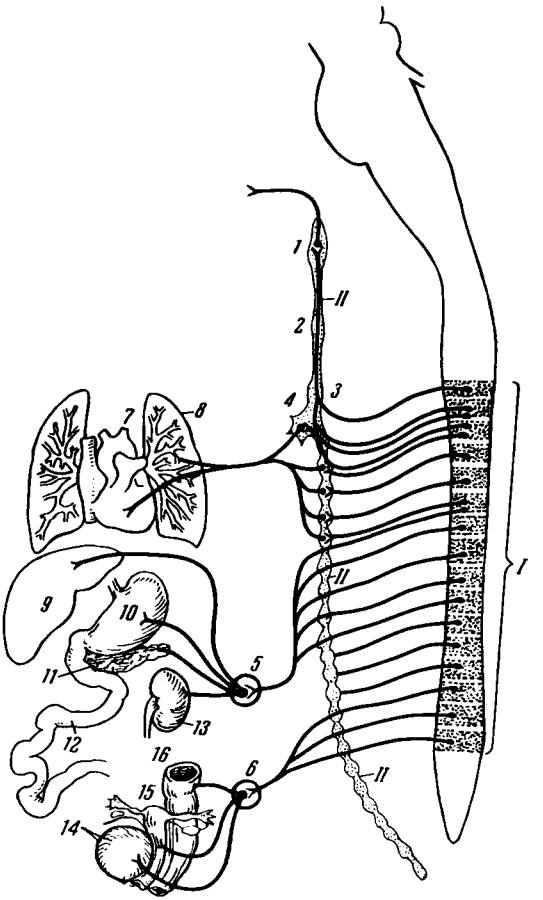

Fig. 18. Diagram of origin of sympathetic fibres and the regions of their distribution

I—thoracic and lumbar parts of the spinal cord; *II*—sympathetic trunk; *1, 2* and *3*—cervical sympathetic ganglions; *4*—first thoracic sympathetic ganglion; *5*—solar plexus; *6*—pelvic plexus; *7*—heart; *8*—lung; *9*—liver; *10*—stomach; *11*—pancreas; *12*—small intestine; *13*—kidney; *14*—bladder; *15*—uterus; *16*—rectum

by the kidneys, intensify or weaken intestinal peristalsis, quicken or slow the heart's action, etc. The vegetative nervous system is the anatomic substrate that ensures these relations. All internal organs have nerve endings which are the receiving apparatus of various stimula (mechanical, chemical, etc.). These nerve endings are called *interoceptors*.

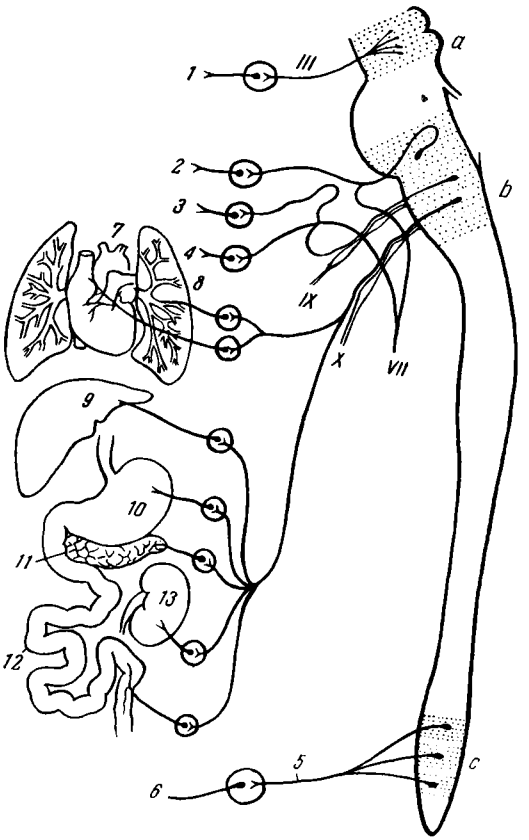

Fig. 19. Diagram of origin of parasympathetic fibres and the regions of their distribution

a and *b*—parasympathetic nuclei in the brain stem; *c*—parasympathetic nuclei in the sacral part of the spinal cord; *III*—oculomotor nerve; *VII*—facial nerve; *IX*—glossopharyngeal nerve; *X*—vagus nerve; *1*—parasympathetic fibres to the muscle constricting the pupil; *2*—parasympathetic fibres to lacrimal gland; *3*—parasympathetic fibres to parotid gland; *4*—parasympathetic fibres to sublingual and submaxillary glands; *5*—pelvic plexus; *6*—parasympathetic fibres to pelvic viscera; *7*—heart; *8*—lung; *9*—liver; *10*—stomach; *11*—pancreas; *12*—intestines; *13*—kidney

The vegetative nervous system consists of two parts—sympathetic and parasympathetic. *The sympathetic nervous system* is represented in the organism by a number of structures. The nerve fibres of this system give off from the thoracic and lumbar parts of the spinal cord (lateral horns). On emerging from the spine the nerve fibres form ganglions which are connected with each other and are arranged along the spine in the form of

chains; these are the so-called *sympathetic trunks* (Fig. 18). The right and left sympathetic trunks consist of 3 cervical, 12 thoracic, 5 lumbar, 4 sacral and 1 coccygeal ganglions each. These ganglions give off so-called *post-ganglionic* fibres which run to internal organs, vessels, smooth muscles, glands, etc.

The fibres of *the parasympathetic nervous system* originate in the mesencephalon, the medulla oblongata and the sacral part of the spinal cord. The vagus nerves emerging from the nuclei of the medulla oblongata are the chief representatives of this part of the vegetative nervous system. Their fibres run to all internal organs in the thoracic and abdominal cavities; the organs located in the minor pelvis are innervated by its sacral part of the spinal cord (Fig. 19.)

The sympathetic and parasympathetic parts of the vegetative nervous system are closely interconnected both anatomically and physiologically (functionally). They are both regulated by the higher vegetative centres located in the hypothalamus, which are in turn subject to regulation by the cortex.

The physiologic basis of their activity is the reflex whose arc may be conceived as follows: nerve impulses travel from an internal organ along posterior roots of the spinal cord and reach the nerve cells of the lateral horns from which a response reaction is transmitted to the internal organ. The reaction may be secretory (secretion of gastric juice, bile) or motor.

NERVOUS DISEASES

CLASSIFICATION OF NERVOUS DISEASES

All nervous diseases can be divided into five large groups according to affection of the particular part of the nervous system.

1. Diseases of the peripheral nervous system: neuralgia, neuritis and polyneuritis.

2. Diseases of the spinal cord: tabes dorsalis, myelitis, poliomyelitis, syringomyelia, amyotrophic lateral sclerosis, multiple or disseminated sclerosis, progressive muscular dystrophy.

3. Cerebral diseases: tumour, trauma, vascular lesions (disorders of cerebral circulation), encephalitis, meningitis, cerebral abscess, chorea.

4. Diseases of the vegetative nervous system: angioneurotic edema (Quincke's disease), migraine, etc.

5. Neuroses: hysteria, neurasthenia, psychasthenia and obsessive reactions (described in "Psychiatry").

This list does not exhaust all forms of diseases, but includes only the diseases discussed in this textbook.

The classification dividing the nervous diseases into five groups is largely conditional since the pathologic process of one disease often involves the brain, the spinal cord and sometimes the peripheral part of the nervous system. This is particularly true of cases in which the disease is caused by infection. For example, meningitis, classified as a cerebral disease, as a rule involves lesions in the membranes of the spinal cord and, contrariwise, tabes dorsalis (in the group of diseases of the spinal cord) is not infrequently accompanied by lesions in the brain; the same applies to poliomyelitis and a number of other diseases. Nervous diseases may also be classified according to the etiologic principle.

The causes of nervous diseases vary very widely. An important part is played by diseases resulting from infection (encephalitis, meningitis, poliomyelitis, tabes dorsalis, chorea and certain forms of polyneuritis).

Lesions in the nervous system are often associated with disturbances in cerebral circulation (cerebral hemorrhage in

hypertensive vascular disease and cerebral arteriosclerosis, thromboses and embolisms of cerebral vessels).

Diseases of the nervous system are often caused by traumas of the brain, spinal cord and peripheral nerves, tumours of the brain and spinal cord, and, less commonly, echinococcus and cysticercus.

Sometimes nervous diseases are associated with acute or chronic intoxication with alcohol, arsenic, lead, etc.

There is a small group of diseases in which lesions in the nervous system are caused by metabolic disturbances. An essential part in the pathogenesis of nervous diseases, which are also studied by psychiatrists, is played by psychogenesis, i.e., diseases resulting from acute or chronic emotional stress. These also include the neuroses. It should be remembered that some organic diseases (which are based on anatomic injuries to the brain) may in their course (especially in the beginning) produce clinical pictures at times barely distinguishable from those observed in functional diseases of the nervous system in which no anatomic changes in the brain are found (for instance, the neuroses). For example, the first manifestations of multiple sclerosis may be symptoms simulating hysteria. Organic signs are often combined with functional.

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM

NEURALGIA

Neuralgia is characterized by pain spreading along the course of a nerve and is usually not accompanied by any appreciable dysfunction of the corresponding organ or muscle. The neuralgias are named according to the affected nerve. For example, the most common neuralgias are those of the sciatic, trigeminal and occipital nerves.

Sciatica or Neuralgia of the Sciatic Nerve (neuralgia n. ischiadici)

Symptoms. Sciatica is characterized by pain along the course of either of the sciatic nerves. It usually develops acutely; sometimes the appearance of pain is preceded by unpleasant sensations in the leg or lumbar region, the patients complaining that the leg feels heavy, that it tires easily, etc.

Pressure applied along the course of the sciatic nerve produces sharp pain. The following points are usually sensitive: the gluteal fold, popliteal fossa and behind the internal malleolus.

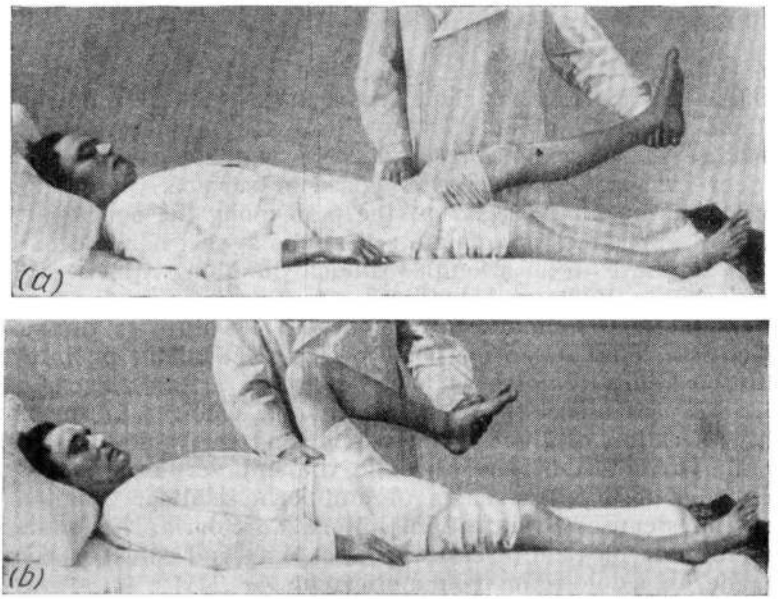

Fig. 20a, b. Test for Lasègue's sign

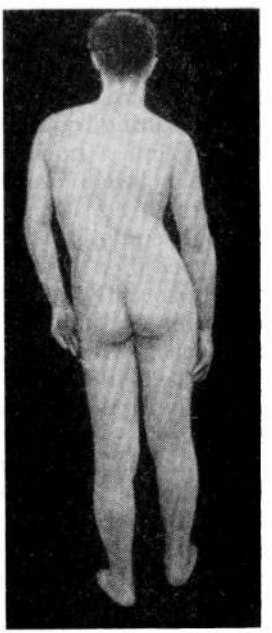

Fig. 21. Right-sided sciatica. Reflex defensive posture

Pain along the course of the stretched sciatic nerve—*Lasègue's sign*—is a very constant sign. This sign is tested as follows: the patient is placed supine and the entire extremity is raised with the knee in full extension (Fig. 20*a*); as the leg is raised the patient feels pain all along its posterior surface. On flexion of the leg in the knee (Fig. 20*b*) the pain along the course of the nerve disappears. Similar pain sensations arise when the patient bends forward (in an attempt to touch the floor with the fingertips) keeping the knees extended.

Sciatica is often marked by a lateral curvature of the spine, which is a reflex defensive posture (Fig. 21). In this posture the pain sensations diminish.

The causes of sciatica vary. Pathologic changes in vertebrae with alteration of their form, which lead to traumatization of the nerve roots emerging through the intervertebral foramens, are often observed in cases of stubborn sciatica. Sciatica is sometimes caused by infection (influenza, malaria, rheumatism), certain gynecological diseases, local cooling and colds, especially on entering a cold room from a hot room.

The cases in which sciatica is caused by inflammation of lumbar and sacral roots are called *lumbosacral radiculitis*. In these cases patients complain of pain in the small of the back and its irradiation to one leg or both. The pain is intensified on the slightest movement. For example, the patient lying on his back feels greater pain in the small of the back on raising his head, laughing, coughing or sneezing. It is especially painful to change from a horizontal to a vertical position and vice versa.

Acute sciatica and lumbosacral radiculitis last from 2 to 6 weeks during which there may be remissions for several days with subsequent exacerbation of the pain syndrome.

In cases of a longer, protracted course of sciatica it is necessary thoroughly to examine the spine in order to exclude the possibility of tumours in the spinal cord or pelvic organs. The latter cases will show, in addition to the pain symptoms, signs of neuritis—the tendon reflexes will weaken or disappear, the muscles will waste away and the pain sensation will diminish or cease.

Treatment. The most popular method of treating sciatica is application of heat—hot sand, hot water bottles, etc. Small bags filled with heated dry sand (or common salt) are placed along the posterior surface of the leg. Various sources of light and heat, application of ozocerite, ultrahigh frequency currents, etc., are widely used.

The other physiotherapeutic agents used in sciatica include quartz, paraffin, galvanization with antipyrine, and diathermy.

In cases of intense and persistent pain the patients are sometimes given intracutaneous injections of 15-25 ml of an 0.25-0.5 per cent novocain solution along the course of the sciatic nerve. This procedure may be repeated every 3-4 days.

Injections of a 5 per cent solution of vitamin B_1 and a 0.005 per cent solution of vitamin B_{12} are helpful. Pyramidon, aspirin and analgine (1-phenyl-2, 3-dimethyl-5-pyrazolone-4-methyl-aminoethylene sodium sulfate) are administered per os. In cases of recurrent sciatica, treatment at health resorts with applications of muds and hydrogen sulfide baths is recommended.

Neuralgia of the Trigeminal Nerve (neuralgia n. trigemini)

Symptoms. This disease is characterized by attacks of sharp cutting or burning pain. As a rule, the attacks of pain begin suddenly, last several seconds or minutes and cease as suddenly. The pains will be felt in different parts of the face and head, depending on the branch of the trigeminal nerve which is affected. During attacks the pains spread over one, two or all three branches of the nerve on one side of the face and head; sometimes the pains go over from one branch to another and may irradiate to the ear, eye, neck and occiput. A neuralgic attack is accompanied by spastic contraction of the facial muscles, redness of the skin, perspiration, increased lacrimation, salivation and secretion of mucus from the nose. The attacks of pain occur either without any visible cause or are provoked by additional stimuli—mastication, speaking, shaving, etc. In between the attacks no objective signs of the disease are, as a rule, observed. Palpation of the nerve trunks at certain points of the face may sometimes reveal excessive sensitivity.

This form of neuralgia is one of the most painful. Patients shudder with horror on recalling the excruciating pain they suffered during attacks and therefore do all they can to safeguard the skin of the face against any unnecessary contact; they avoid touching the painful parts with a finger even when telling the physician where it hurts and are often afraid of a physical examination.

Cause. Neuralgia of the trigeminal nerve is often caused by infections—malaria, tuberculosis and syphilis. Factors leading to compression of branches of the trigeminal nerve in the bony orifices of the facial skeleton, through which they emerge from the cranial cavity, play an important part in the onset of neuralgia. Sometimes neuralgia of the trigeminal nerve is associated with inflammatory processes in the accessory sinuses or diseases

of the teeth. An essential role in this condition is thought to be played by metabolic disturbances—gout and diabetes mellitus.

Treatment. In each case of neuralgia of the trigeminal nerve it is necessary, as far as possible, to establish its actual cause and treat the underlying disease. Symptomatic treatment consists in administration of vitamins B_1 and B_{12}, pyramidon, aspirin, antipyrine, phenacetin (acetophenetidin). Local applications include heat (hot water bottles), hot compresses, ultrahigh frequency currents, physiotherapy (various sources of light, iontophoresis with antipyrine or aconitine), roentgen therapy. A nerve block may be effected by injecting novocain or alcohol. Surgical intervention is resorted to less frequently.

Since each attack of pain is accompanied by a sense of fear and new attacks are awaited with alarm, it is necessary to reassure and divert the patient. This is important because in cases of frequent attacks some patients become completely desperate and harbour suicidal thoughts.

Neuralgia of the Occipital Nerve (neuralgia n. occipitalis)

Symptoms. This neuralgia is marked by attacks of pain in the occiput with the pain irradiating to the neck and back. The patients also complain of constant dull pain in the entire posterior surface of the head. To escape the pain the patients sometimes hold the head in a certain, forced position. Palpation reveals pain points most commonly between the mastoid process and the upper cervical vertebra. In cases of protracted neuralgia hyperesthesia is observed in the hairy part of the head—the patients have an unpleasant sensation in the skin of the occiput when brushing their hair.

Cause. As in other forms of neuralgia, the cause is most commonly infection (influenza, malaria, etc.) and such affections of the spine as spondylo-arthrosis (osteoarthritis of the spine) or osteochondrosis of the neck.

Treatment. Local applications of various sources of light and heat (Sollux, sun lamps and mustard plasters). Ionization with antipyrine, potassium iodide, and aconitine is recommended. Massage of the posterior surface of the neck and exercise therapy are indicated after cessation of sharp pains. Anti-neuralgic agents are administered per os and vitamins B_1 and B_{12} are injected.

Intercostal Neuralgia (neuralgia n. intercostalis)

Symptoms. Intercostal neuralgia is characterized by paroxyzmal pain in the intercostal spaces, usually on one side, against the background of constant gnawing pains. The pain, as a rule, increases on movement, deep inhalation, coughing and sneezing. Palpation of the corresponding intercostal space is painful.

Cause. The onset of this form of neuralgia is thought to be associated with influenza and malaria. Moreover, it is observed in diseases of the spine, after rib fractures (callus) and in diseases of thoracic organs (pleura, lungs). Sometimes intercostal neuralgia is based on a lesion in the brachial plexus. In these cases, in addition to the aforementioned pains, an outbreak of an eruption of small vesicles is observed on the corresponding portion of skin (along the course of the nerve) on the thorax. In form these vesicles resemble the eruptions breaking out on the lips in fevers (so-called herpes). This form of intercostal neuralgia accompanied by eruptions on the skin is referred to as herpes zoster. The disease lasts 2-3 weeks. It is caused by a filtrable virus.

Treatment. Intravenous administration of 5-10 ml of a 40 per cent urotropin solution on alternate days, and aspirin and pyramidon per os are indicated in cases of herpes zoster. Injections of penicillin are sometimes prescribed. Mercury vapour lamps are one of the physiotherapeutic agents used (in the absence of pulmonary tuberculosis). To reduce the sense of burning in the skin at the sites of eruption, dusting the eruptions with white streptocide is recommended.

Neuritis

Neuritis is an inflammation of a nerve. An inflammatory process in a nerve may arise as a complication of an infectious disease. Neuritis most commonly follows typhus, typhoid fever, diphtheria, pneumonia, influenza, rheumatism and other infections, including virus infections. Chronic excessive use of alcohol is a factor which in a number of cases is conducive to neuritis. In addition to neuritides of an infectious origin, there are neuritides connected with poisoning (arsenic, lead, alcohol, etc.). The term "neuritis" is also used to designate traumatic affections of nerves resulting from bullet wounds, open bone fractures, injury to a nerve by a cutting instrument, etc.

Affection of a single nerve is called *mononeuritis*, affection of several nerves—*polyneuritis*.

The main symptoms of neuritis are: pain along the course of

Fig. 22. Paralysis of the left facial nerve

the nerves at the onset of the disease with subsequent loss of motor and sensory functions—paresis (incomplete paralysis) or paralysis of a peripheral type (atonia and atrophy of muscles with areflexia), diminution or complete absence of pain sensation. Moreover, there may be trophic changes in the skin (thinning and dryness, changes in its pigmentation), loss of hair, brittleness of nails, etc.

Neuritis of the Facial Nerve (neuritis n. facialis)

Symptoms. Neuritis of the facial nerve is marked by paresis or paralysis of the mimetic muscles of half of the face on the side of the affected nerve. A sharp asymmetry of the face is observed—the mouth is twisted toward the healthy side, the nasolabial fold is considerably smoothed out on the affected side with the corner of the mouth on this side drooping (Fig. 22). Attempts to raise the eyebrows and wrinkle the forehead result in raising only one eyebrow and wrinkling of the forehead only on the healthy side of the face. On attempts to show the teeth the corner of the mouth is pulled still more to the healthy side. Sometimes the patients are unable to puff out their cheeks or whistle. If the patient is asked to shut his eyes, the eye on the paralysed side will fail to shut (hare eye). Since the facial nerve is only a motor nerve, no disturbances in sensitivity are usually observed.

Cause. Neuritis of the facial nerve is most frequently due to infectious diseases. An important part is played by cooling. Diseases of the middle ear are not an uncommon cause since the facial nerve runs near the tympanic cavity. Since it passes through the parotid gland, inflammation of the latter may cause neuritis. In pathology the nucleus of the facial nerve in the brain stem may become affected and produce the picture of neuritis.

Treatment. Aspirin and sodium salicylate are widely administered in so-called cold-provoked and influenzal neuritides of the facial nerve. Treatment with penicillin and intravenous injections of urotropin are recommended. Heat and diathermy are

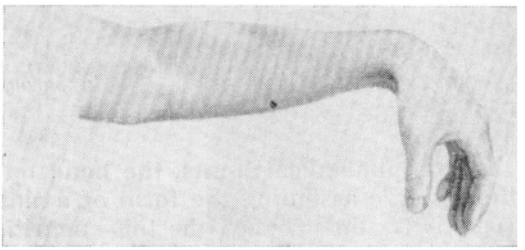

Fig. 23. Position of left hand in paralysis of the radial nerve

prescribed. In cases of ear diseases it is necessary to carry out corresponding therapeutic measures. Massage, exercise therapy and rhythmic electrization are indicated during the period of restoration of movements. Dibazol (hydrochloride salt of a complex heterocyclic compound with benzene radical) 0.02 g 3 times a day is prescribed, vitamins B_1 and B_{12}, and proserine (neostigmine) are administered to improve the conductivity of the nerve. In the event of incomplete closure of the eyelids it is necessary systematically to instill vaseline oil and wear a protective bandage in order to prevent the cornea from drying.

With timely treatment acute neuritis of the facial nerve may be completely eliminated within 3-4 weeks. In a number of cases the disease runs a more protracted course.

Neuritis of the Radial Nerve (neuritis n. radialis)

Symptoms. The most significant symptom of this neuritis is a pendulous hand, the patient being unable to extend the hand and fingers (Fig. 23).

Cause. This neuritis, like all other neuritides of the arms, is the result of trauma to the forearm. The radial nerve is more commonly affected also because it is easily compressed in the middle part of the upper arm where it rounds the humerus and passes from the posteromedial surface of the latter to its ventrolateral surface. This nerve is often compressed during sleep when the extended arm lies on a solid object with the head of the sleeper resting on it. In a state of extreme inebriation a person may easily fall asleep in this position with the result that the arm may undergo overcooling. Both these factors are conducive to development of neuritis.

Neuritis of the Ulnar Nerve (neuritis n. ulnaris)

Symptoms. The patient cannot flex his fingers in the metacarpophalangeal joints, adduct or abduct them, or extend them in

Fig. 24. Position of fingers in paralysis of the ulnar nerve

the interphalangeal joints, the hand on the side of the affected ulnar nerve assuming the form of a claw (Fig. 24). The zone of sensitivity disturbance in this neuritis is shown in Fig. 25.

Neuritis of the Median Nerve (neuritis n. mediani)

Symptoms. The patient is unable to pronate the forearm, oppose the thumb (cannot touch the little finger with the thumb), flex the hand or clench a fist. This neuritis is observed less frequently than neuritis of the ulnar nerve. Sometimes both of them occur simultaneously. The sensitivity is impaired (hypesthesia or anesthesia) on the medial surface of the hand, the palmar surface of the 1st, 2nd, 3rd and half of the fourth finger, and on the dorsal surface of the terminal phalanges of the three middle fingers.

Sciatic Neuritis (neuritis n. ischiadici)

Symptoms. The first signs of the disease are pains along the course of the nerve. Subsequently, in the event of lesions in the upper parts of the sciatic nerve, the leg cannot be flexed in the knee, and all muscles of the foot are paralysed. Sensitivity is disturbed on the lateral surface of the shin and foot. The Achilles tendon reflex is lost. The peroneal nerve, one of the branches of the sciatic nerve, is affected somewhat more frequently; in these cases the foot is observed to hang loosely (Fig. 26), the

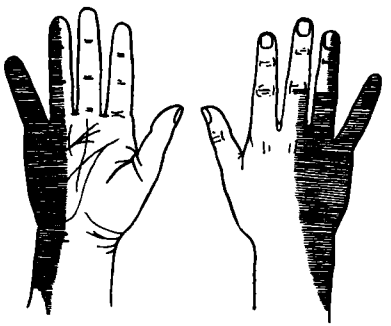

Fig. 25. Territory of sensory innervation of the ulnar nerve

Fig. 26. Pendulous foot in paralysis of the peroneal nerve

patient cannot stand on his heel without touching the ground with the rest of his foot. To avoid brushing the ground with the ball of the foot when walking, persons with this affection therefore raise the knee high and throw, as it were, the foot forward. In cases of bilateral affection of these nerves the patient walks in a peculiar manner, the gait being referred to as the *steppage gait*. As stated in the beginning of this part of the book, isolated neuritides are particularly frequently observed in cases of trauma and less frequently after infections and poisonings. Total severance of the nerve is followed by peripheral, flaccid paralysis with characteristic signs. In cases where the nerve is partly destroyed the patients have intense burning pains. These pains arise spontaneously, but are sometimes intensified even by stimuli which are not aimed at the skin. For example, the pains may become more intense from loud noises and bright light. Because of their peculiarity these pains have been named *causalgia*. Patients suffering from this disease sleep poorly, are extremely excitable and irritable, and often refuse to talk. These pains diminish from cold water and the patients themselves therefore apply a towel soaked in cold water or immerse the affected extremity in cold water.

*Treatment.** Traumatic neuritis with complete severance of the nerve trunk requires surgical intervention with suturing the

* For treatment of neuritis of infectious origin see "Treatment of Polyneuritides".

central end of the affected nerve to its peripheral end. Subsequently, as movement and sensitivity are restored, injections of vitamins B_1 and B_{12}, administration of dibazol and proserine, and physiotherapy (galvanization, faradization) are resorted to. Exercise therapy and massage play a very important part. These measures must be taken to prevent complications (especially in protracted disease) in the form of muscle and tendon contractures, and development of immobility in the joints due to inactivity. In cases of stable residual neuritis in the feet it is very important to supply the patient with orthopedic footwear in due time.

Analgesics are prescribed in cases of causalgia. Silence must be strictly maintained in wards and corridors; there must be no loud talking, noise, etc. For the night such patients should be given hypnotics.

Polyneuritis

Polyneuritis is a multiple inflammation or degenerative involvement of several nerves. Multiple neuritides are divided into acute, subacute and chronic, according to their course. Several forms of polyneuritis are distinguished clinically, depending on their causes. All polyneuritides are characterized by disturbance in motor and sensory functions in the extremities, the distal (furthest removed from the trunk) parts of the extremities being particularly affected. Muscular weakness to the point of complete paralysis and absence of sensation is especially marked in the hands and feet. Closer to the trunk (proximally) these disturbances gradually decrease. The pathologic process is distributed more or less uniformly over all the nerves of the extremities, i.e., is symmetrical. The tone and power of the muscles diminish. The nerve trunks are painful on palpation; spontaneous pains, resembling those in neuralgia, are also observed. The muscles are noticeably wasted. The tendon reflexes are either sharply weakened or completely absent. As a rule, the pathologic process does not involve the cranial nerves. The vagus and phrenic nerves are affected in rare cases; these affections are marked by cardiac and respiratory disturbances and readily lead to so-called congestive pneumonias which constitute a danger to the patient's life.

Infectious Polyneuritis (polyneuritis infectiosa)

Symptoms. As a rule, the disease begins as an acute febrile process with a rise in body temperature to 38-39°C. Pains in the extremities appear. Development of weakness and paralyses in

the arms and legs is subsequently (over a period of days or weeks) observed; the sensitivity of the skin of the extremities considerably diminishes. The nerve trunks are very painful on palpation. Retrogression of the symptoms is slow.

Cause. Today most investigators believe infectious polyneuritis to be caused by a filtrable virus.

Diphtheritic Polyneuritis (polyneuritis diphtherica)

Symptoms. This form of multiple neuritis developing at the end of diphtheria is, in addition to the usual picture of polyneuritis, marked by lesions in the nerves of the soft palate. Hence, the frequent manifestation of the disease is a difficulty in swallowing (patients choke over the food since it enters the nose and trachea). The voice of such patients acquires a nasal tone, as is the case in severe rhinitis. The phrenic and vagus nerves are sometimes also affected and may cause respiratory and cardiac disturbances, etc. Less frequently the pathologic process involves the nerves which innervate the accommodating muscles of the eyes and thus leads to impairment of vision; this is particularly noticeable in reading. Diphtheritic polyneuritis lasts several months and sometimes up to a year.

Alcoholic Polyneuritis (polyneuritis alcoholica)

Symptoms. This polyneuritis develops gradually. It begins with unpleasant sensations in the legs (rapid tiring), pains in the gastrocnemius muscles, cramps of the toes, etc. The pathologic phenomena gradually increase. Examination reveals pain along the course of the nerve trunks, especially in the lower extremities. As a rule, pareses and paralyses are also more strongly marked in the legs, and usually affect the muscles innervated by the peroneal nerve (see description of neuritis of this nerve on p. 61). This picture of alcoholic polyneuritis is sometimes accompanied by a number of psychic disturbances which were first described by the outstanding Russian psychiatrist S. Korsakov. These disturbances for the most part boil down to forgetfulness of current events. For example, the patient cannot remember the name of his attending physician even if it was repeatedly mentioned to him, forgets the conditions of the problem he has just been given to solve, cannot say where he is, the time of the year, date, etc. Not infrequently the patient is observed to confabulate, i.e., he often tells stories which have no

basis in fact. Patients with alcoholic polyneuritis exhibiting these memory disturbances are said to be affected with Korsakov's psychosis. In addition to chronic alcoholism, an important part in the development of alcoholic polyneuritis is played by impaired vitamin metabolism, especially vitamin B_1 and nicotinic acid.

There are also polyneuritides resulting from poisoning with arsenic, lead, mercury and carbon monoxide, and polyneuritides caused by avitaminosis. Lead polyneuritis, in addition to general intoxication (dizziness, headache, a lead line on the gums, protein in the urine, and lead colic), particularly involves the nerves of the upper extremities.

Mercury polyneuritis is characterized by stomatitis, tremor and ataxia.

Avitaminosis polyneuritides are associated with intoxication due to a deficiency or total lack of nicotinic acid or vitamin PP (in pellagra) or vitamin B_1 (in beriberi) in the food.

Treatment of Polyneuritides. The indispensable condition for the treatment of any polyneuritis is complete bedrest and quiet, especially in cases of affection of the vagus and phrenic nerves. Detoxification therapy and intravenous injections of a 40 per cent urotropin solution are resorted to during the acute period of the disease. Penicillin injections and infusions of glucose with ascorbic acid are administered in infectious polyneuritis. Antidiphtheritic serum, vitamins B_1 and B_{12}, and proserine are prescribed for diphtheritic polyneuritis. Massage, four-chamber baths, and mud therapy are indicated after termination of the acute period of the disease. In protracted cases it is necessary to prevent muscle contractures. This is achieved by exercise therapy and special fixation of the hands and feet in the normal position.

Resort treatment is also indicated.

DISEASES OF THE BRAIN AND SPINAL CORD

Acute Anterior Poliomyelitis (Poliomyelitis Anterior Acuta)

Poliomyelitis is an acute viral affection of the central nervous system, often of an epidemic character.

This disease is observed mainly in early childhood—from several months to 4-5 years of age. Hence, the other name of the disease—infantile paralysis. Investigations have shown that various parts of the brain and spinal cord are affected in this disease. The most strongly pronounced and permanent changes are noted in the grey matter of the spinal cord, the anterior

(motor) horns in particular. The pathologic process may involve various parts of the spinal cord.

The greatest disease incidence is observed during the summer and autumn months.

Symptoms. The early symptoms of the disease are chills and gastrointestinal disturbances (diarrhea, constipation, vomiting). The temperature rises to 38-39°C and higher and has a saddle-back curve. Its first rise lasts 1-4 days, then it drops to normal for 2-4 days, after which it rises again. Since there are no specific symptoms of poliomyelitis during this period the onset of the disease is often mistaken for influenza, angina or some gastrointestinal ailment. In addition to the aforementioned symptoms, this period is marked by rigidity of the occipital muscles, hyperesthesia of the entire skin, and excessive general or local (head) perspiration. Sometimes the disease shows only the foregoing symptoms all through its course without development of the paralytic stage. There are cases in which the temperature rises for only a few hours and is unnoticed. Some cases are marked by general or local convulsions.

Paralyses develop during the second stage of the disease, for which reason the second stage is called the paralytic stage. The paralyses develop most frequently in the lower extremities, less commonly—in the upper extremities; sometimes paralysis involves a leg and an arm on one side. The muscles of the trunk, neck and face are also often paralized. The patient's life is in great danger in cases of affection of the nuclei of the medulla oblongata, since this may lead to severe respiratory and cardiac disturbances. Since the disease affects the anterior horns of the spinal cord the paralyses are flaccid, peripheral-type—the muscle tone is sharply diminished, the tendon reflexes are lost, and in a few weeks, if there is no improvement, muscular atrophy is observed. The proximal parts of the extremities are affected the most. As a rule, no sensory disturbances are noted.

The next period (several days after development of paralyses) is marked by restoration of movements in certain groups of muscles. This is due to the fact that the inflammatory edema which has developed in the grey matter of the spinal cord, in the regions adjacent to the main focus of affection, passes and the function of these parts is restored.

The main symptoms during the terminal stage of the disease are stable paralyses of certain groups of muscles. Since atrophy and inactivity of the muscles affect the growth of bones, retarded growth of the affected extremities is usually observed; sometimes the extremities, especially the feet, are deformed. Contractures may also develop.

In some cases the patient exhibits only a peripheral paralysis of the facial nerve. There are considerable difficulties in diagnosing cases of so-called bulbospinal poliomyelitis in which the 12th, 10th and 9th pairs of cranial nerves are affected, and respiration and heart action are impaired.

Cause. Poliomyelitis is caused by a virus. The disease is transmitted by patients or virus carriers. The infection enters the organisms through the digestive or respiratory tract.

Treatment. Complete quiet and bedrest. Hospitalization of each polio patient for at least 40 days is necessary. During the early period of the disease—injections of antimeasles serum and serum of people who have survived poliomyelitis, 25-30 intramuscular injections of the parents' blood (5-10 ml, gradually increasing the dose to 20 ml); gamma-globulin (for 3 days in a dose of 1 g per 1 kg of body weight) should also be used during the same period. Securinine ($C_{13}H_{15}NO_2HNO_3$) and polyvitamins are prescribed.

Intravenous injections of 5 ml of a 40 per cent urotropin solution and infusions of a 40 per cent glucose solution with ascorbic acid are recommended. Moreover, the patients are prescribed plenty of warm drinks, hot packs and light-baths; all these measures are aimed at increasing perspiration.

If the patients have pains they are administered analgesics—analgine, pyramidon, bromides. Nutritive enemas are resorted to when deglutition disorders are present. In cases of respiratory disturbances artificial respiration is administered by means of a respirator or manually.

During the restorative period the treatment consists in diathermy and ultrahigh frequency currents, subcutaneous injections of proserine (0.3-0.5-1 ml of a 0.05 per cent solution for 10-12 days) and vitamins B_1 and B_{12}, dibazol, adenosine triphosphoric acid and galanthamine parenterally; within 1-2 weeks —massage of the affected extremities and exercise therapy. Of considerable importance during this period are measures aimed at preventing deformities and contractures in the extremities, for which purpose the extremities must be placed in the proper position. Patients are also sent for treatment to health resorts and sanatoriums. Cases of irreversible motor impairment require orthopedic and surgical treatment.

Prevention. All poliomyelitis patients must necessarily be isolated and hospitalized. Measures of controlling intestinal infections must be carried out; for this purpose it is important to increase sanitary supervision of drinking water and foodstuffs. In the event the patients were in contact with other children the latter should be given 3 intramuscular injections of 3

ml of gamma-globulin (over a period of 3 days) by way of prophylaxis.

Prophylaxis consists in vaccination of all infants, beginning with the age of 2 months, and adolescents with a living attenuated polio virus for which purpose drops or special dragée are prepared. Vaccination is conducted in 5 sessions, the first three of them with a 3-6 weeks interval, the 4th, half a year, and the 5th, a year and a half later.

The poliomyelitis patient may not be discharged from hospital before 6 weeks from the onset of the disease. The patient's premises must be disinfected. In carrying out prophylactic measures it must be remembered that the infection may be transmitted by healthy people who are virus carriers, for which reason all persons who were in contact with poliomyelitis patients must carefully observe the rules of personal hygiene. Gargling the throat with a 1 per cent hydrogen peroxide solution or a weak potassium permanganate solution (1 teaspoonful of a 1 per cent solution per glassful of water) is recommended.

A 3 per cent chloramine solution is used to disinfect the premises and a 1-3 per cent activated chloramine solution—to disinfect linens and toys (depending on the degree of contamination).

The patient's excretions (urine, feces, mucous nasal discharge) should be disinfected with calcium hypochloride, carbolic acid or potassium permanganate.

Myelitis

Symptoms. Myelitis—acute inflammation of the spinal cord—usually develops as a complication of various infections (influenza, typhus, typhoid fever, syphilis, scarlet fever, whooping cough, etc.) as a sequel to purulent processes in the organs of the small pelvis and as a result of primary affection of the spinal cord with various viruses (rabies, viral influenza). The pathologic process is based on formation of an inflammatory focus, most commonly in the thoracic division of the spinal cord. As a rule, this inflammatory focus embraces the entire circumference of the spinal cord (both the white and grey matter) and transects it, as it were, at the corresponding level.

If the focus is localized to the upper cervical segments of the spinal cord, spastic paralysis of all four extremities develops. If the focus is in the cervical enlargement, a flaccid paralysis develops in the arms and a spastic paralysis in the legs. Affection of the thoracic division gives rise to spastic paralysis of the lower extremities and disturbances in the functions of the pelvic viscera. Lastly, affection of the lumbar enlargement results

in development of flaccid paralysis of the lower extremities also accompanied by pelvic disorders.

Conduction-type disturbances in sensitivity, i.e., along the entire body surface below the level of the lesion, are observed. The patient's tissue trophism is sharply impaired, for which reason deep and severe decubitus ulcers in the regions of the sacrum, buttocks or legs often develop. Very serious symptoms of myelitis are disturbances in the functions of pelvic organs (retention of urine and feces) which frequently lead to development of urosepsis.

The disease often runs an acute course with pareses, paralyses and other symptoms usually arising within a few days of its onset. It retrogresses very slowly—over a period of months and sometimes years. In the event of slow development of the clinical picture a neoplastic process in the spinal cord must be considered (a growing tumour slowly compresses the spinal cord). Sometimes compression of the spinal cord is caused by disease of the vertebrae, for example, tuberculous spondylitis.

Treatment. Strict confinement to bed. Penicillin and other antibiotics as well as sulpha drugs are administered in the beginning of the process, depending on the main infectious disease. A course of injections of 40 per cent urotropin or tripaflavine is carried out. Since the patients often develop severe and extensive decubitus ulcers (bedsores), it is particularly important carefully to attend to these patients. The patient must be placed on a rubber ring and his skin must be kept clean, which requires washing, rubbing down with camphorated alcohol, etc., especially at points where the skin has become red. The sheets must not be creased. The patient's position in bed must be frequently changed. In cases of urinary retention the rules of asepsis must be carefully observed during catheterization because introduction of infection into the bladder may lead to its severe inflammation and sometimes to development of urosepsis. In cases where catheterization is impossible surgical intervention—suprapubic fistulization of the bladder—is resorted to.

During retrogression of the disease the treatment consists in physiotherapy (diathermy, iontophoresis with iodine), massage, exercise, injections of proserine, dibazol, vitamin B_{12} and securinine.

Tabes Dorsalis

Tabes dorsalis is one of the diseases of the nervous system caused by syphilis.* An average of 8-15 years usually elapses

* As a result of state-wide measures of syphilis control in the U.S.S.R. the incidence of this disease has been sharply reduced

between the onset of syphilis and the appearance of signs of tabes dorsalis. The main changes underlying the basic symptoms of the disease are degeneration in the posterior roots and posterior columns of the spinal cord. In the end this degeneration leads to contraction, "desiccation" of the posterior columns and posterior roots of the spinal cord. Usually the pathologic process is most strongly pronounced in the lumbar and sacral parts of the spinal cord.

Symptoms. At the outset—attacks of intense shooting and cutting pains. Such pains usually occur in the legs, but may also be in other parts of the body. The attacks are very short, and the intervals between attacks differ very widely. There are cases, however, in which the attacks of such pains with short intervals last several hours. The disease is characterized by so-called girdle pains. The patients often complain of numbness and tingling in the lower extremities. These phenomena are associated with compression of the posterior (sensory) roots of the spinal cord. The knee and Achilles tendon reflexes are either diminished or lost. As a rule, the patients complain of a poor sense of the ground under their feet, which is due to affection of the posterior columns of the spinal cord (they contain the pathways of deep and tactile sensitivity). Urinary disturbances occur during the same period; in the beginning—rare urges to urinate, subsequently—considerable difficulty in urination which may be followed by urinary incontinence. Affection of the posterior columns gives rise to incoordination of leg movements—ataxia, which is primarily manifested in gait disturbances; the gait becomes inconfident and waddling. When walking the patient watches his legs (controls the proportionality of movements with his eyes); climbing stairs is particularly difficult. These gait disturbances are considerably increased in the dark or on walking with the eyes closed. The patient cannot maintain equilibrium when standing with his feet together and his eyes closed —Romberg's sign. Nor can the patient perform the heel-to-knee-to-toe test (see p. 47). Tactile sensitivity (sense of touch) is impaired.

The characteristic symptoms of tabes dorsalis include so-called *crises*—paroxysmal pains in the internal organs (most commonly in the stomach). These gastric crises are often accompanied by considerable vomiting. Similar crises may occur in the intestines, bladder, rectum and other organs.

The Argyll-Robertson's sign is, as a rule, positive. The essence of this sign is that the pupils respond to convergence and accommodation, but not to light. The pupils are often of unequal size and of irregular form. Examination of the fundus oculi

reveals a certain degree of atrophy of the optic nerves, which is the cause of blindness that sometimes develops in this disease.

The Wassermann blood and spinal fluid tests are sometimes positive.

The symptoms indicating disturbances in the trophic functions of the nervous system are of no lesser importance; these symptoms include brittleness of the leg bones (this is scarcely accompanied by pain), and deep, perforating ulcers on the plantar surface of the feet. The knee joints may be sharply enlarged and deformed—so-called arthropathy.

Tabes dorsalis is a chronic, slowly progressing disease. In unfavourable cases the patients are eventually unable to move about unassisted because of strongly marked ataxia.

Treatment. Since the disease is caused by syphilis the main treatment is specific and consists of a course of 15 intramuscular injections of bioquinol (quinine in neutral vegetable oil)—2 g every other day—and 10,000,000-15,000,000 u of penicillin. Iodides are given both per os and intravenously. Strychnine injections sometimes abate ataxia. Symptomatic treatment (pyramidon, phenacetin and other analgesics) is aimed at alleviating pain. Adrenalin (10 drops of a 1:1000 solution) per os is recommended in gastric crises. An injection of 5-10 u of insulin offers relief in some cases.

No narcotics (pantopon, morphine) should be administered for fear of habituation.

Prophylaxis of tabes dorsalis consists in timely and systematic treatment of syphilis in its incipient stages.

Disseminated or Multiple Sclerosis (Sclerosis Disseminata)

Multiple sclerosis manifests itself in numerous small focal lesions in the brain and spinal cord. The lesions are microne-croses more often of the white matter of the brain tissue accompanied by demyelinization of nerve fibres. Subsequently proliferation of the glia cells in these patches results in the formation of so-called sclerotic plaques.

The plaques are localized mainly in the white matter and thereby impair the conduction systems. Their localization in the central nervous system varies very widely—spinal cord, brain stem, cerebellum, cerebral hemispheres, etc.; hence, the multiformity of symptoms observed in multiple sclerosis.

Symptoms. The most characteristic and most commonly observed symptoms are as follows: the onset of the disease is

marked by gradual (or sometimes sudden) appearance of disturbances in the lower extremities manifested in greater fatigability of the legs (or one leg), numbness, pains and sometimes intention tremor particularly pronounced in the hands and most clearly revealed by the finger-nose test (see p. 47) These disturbances affect the handwriting and make eating, especially swallowing of liquid food, difficult. The symptoms include nystagmus and scanning speech (see p. 47). All these symptoms indicate affection of the cerebellar systems. The disease is sometimes accompanied by impaired vision, in some cases to the point of total blindness. The other signs of the disease are frequently observed spastic pareses and paralyses of the legs (either the right or left leg being predominantly affected). The abdominal reflexes are often absent and the functions of the pelvic organs are disturbed; the latter disturbances consist in urinary retention, less frequently urinary incontinence, and disorders of defecation.

The disease most commonly begins at the age of 20-30. It is characterized by a protracted course and gradual progress. Flare-ups alternate with remissions which last for weeks, months and even years, with some of the symptoms diminishing or disappearing. The flare-ups are due to appearance of new foci of affection.

Cause. Most investigators believe multiple sclerosis to be caused by a filtrable virus.

Treatment. Rest. Injections of a 40 per cent urotropin solution and penicillin are recommended. General roborants—iron and arsenic preparations, vitamins B_1 and B_{12}, adrenocorticotropic hormone and adenosine-triphosphoric acid—are prescribed. Physiotherapy—warm baths, massage, exercise—is indicated. Autohemotherapy and roentgen therapy are resorted to.

Syringomyelia

This disease is characterized by formation of cavities in the centre of the grey matter of the spinal cord (Fig. 27). The cavities result from proliferation of neuroglia and its subsequent disintegration. They are most commonly situated in the cervical and thoracic parts of the spinal cord and vary in length and width. On enlarging they destroy the grey matter, impairing the conductors of pain and thermal sensations; these conductors run, as is well known, anteriorly to the central spinal canal (in the region of the anterior grey commissure). In cases where the process extends to the anterior and lateral horns

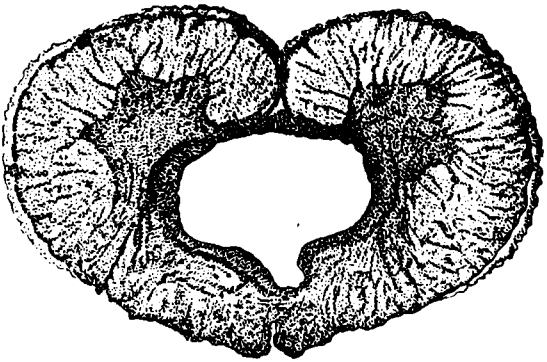

Fig. 27. Syringomyelitic cavity in the spinal cord

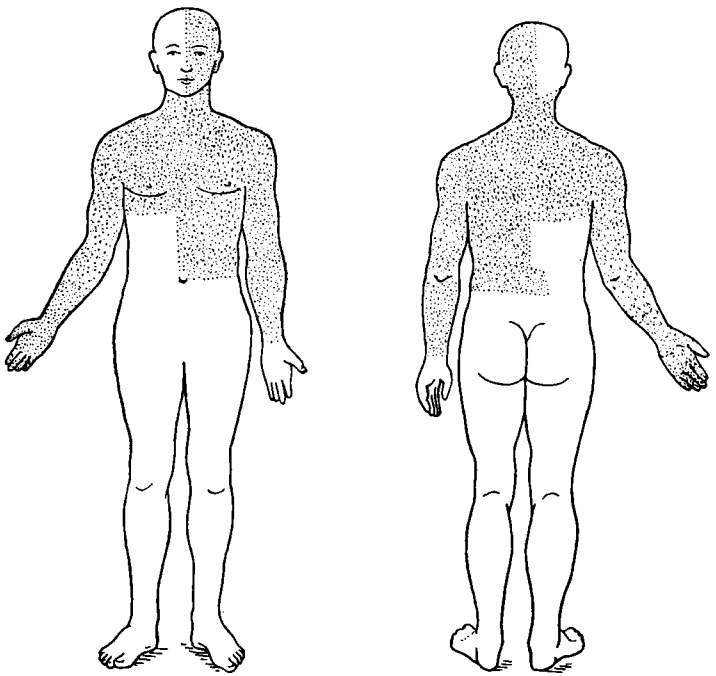

Fig. 28. Syringomyelia. Distribution of disturbances in pain and thermal sensitivity on development of a central cavity in the cervical and thoracic parts

muscular atrophies develop on the level of these segments (compare with poliomyelitis); various trophic disorders, including arthropathies, are possible. For example, atrophic changes in the muscles of the arms and, especially, the hands are observed in lesions in the cervical part of the spinal cord.

Symptoms. The disease is very often marked by impairment of pain and thermal sensitivity, while tactile sensitivity remains unaffected; this is a so-called *dissociated disorder of sensitivity.* The sensitivity of the skin of the arms and trunk is disturbed according to the level of affection of the spinal cord and is of a segmentary character. A diagram of sensitivity disorders in cases of development of a central cavity in the cervical and thoracic parts of the spinal cord is given in Fig. 28. The patients are insensitive to pain and heat and therefore sometimes sustain severe burns. That is why examination of these patients sometimes reveals traces of former burns and other bodily injuries. If the enlarging cavity destroys the anterior horns, the result is weakness and atrophy of the arm muscles. Syringomyelia is often also responsible for vegetative and trophic disorders, the skin at the sites of impaired sensitivity becoming rough (cornification of the epithelium), cyanotic and dry, and sometimes covered with abscesses and blisters. Minor injuries result in long-unhealing wounds, ulcers, etc.

The joints are deformed. Examination of the spine often reveals some curvature (kyphosis, scoliosis, etc.). These changes are associated with affection of the lateral horns of the spinal cord.

The disease runs a protracted, chronic course. In cases where the process extends upward from the cervical part, into the medulla oblongata (syringobulbia), there is a danger of affection of vitally important centres—nuclei of cranial nerves.

Treatment. Enlargement of the cavity can be arrested by roentgen therapy which is particularly effective in the beginning of the disease. General roborants and physiotherapy—massage, electrization exercise therapy, ultrahigh frequency currents applied to the spinal cord, sulphur and radon baths—are indicated; proserine, dibazol, vitamins B_1, B_2 and intravenous injections of glucose with ascorbic acid are also recommended. To alleviate pain, analgine and pyramidon are prescribed.

While nursing the patients and subjecting them to water and other thermal treatment it is necessary to bear in mind that they easily sustain burns and other injuries in virtue of the impaired pain and thermal sensitivity. The patients should be freed from hard physical labour and from works which involve contact with fire, molten metal, etc.

Amyotrophic Lateral Sclerosis (Sclerosis Lateralis Amyotrophica)

This disease involves the lateral columns of the spinal cord, the anterior horns of grey matter (most commonly the cervical part) and some nuclei of cranial nerves (7th, 9th, 10th and 12th pairs) situated in the brain stem. The essence of the pathologic process in the aforementioned parts of the spinal cord consists in degenerative-atrophic changes and destruction of both nerve cells and nerve fibres.

At the site of atrophied sections of the lateral columns proliferation of the neuroglia (sclerosis) is observed.

Symptoms. The main signs of the disease are as follows: flaccid, atrophic paralyses of the upper extremities beginning in the muscles of the hands, with intensified tendon and periosteal reflexes in them, spastic (central) paresis or paralysis of the lower extremities and a number of bulbar disorders—impaired articulation (dysarthria), difficulty in swallowing (dysphagia), chocking on food (penetration of food into the respiratory passages) and a nasal tone of the voice.

Recent investigations have established sensory disorders but these are not the most important symptoms.

The disease runs a slow course, but makes steady progress. It lasts an average of 3-4 years and ends lethally.

The cause of the disease is unknown; there are some indications that it is of an infectious nature.

The treatment is symptomatic—massage and baths. The patients are given injections of strychnine, proserine and vitamins B_1, B_{12} and E. They need careful nursing. Owing to the extreme weakness of their hands they are often unable to eat unassisted. They must be fed cautiously and in a sitting posture, the food being given slowly and in small portions since, owing to dysphagia, the food may gain entrance into the respiratory tract.

Progressive Muscular Dystrophy (Distrophia Musculorum Progressiva)

This disease belongs to the group of myopathies. It develops as a result of disturbances in metabolism (mainly carbohydrate) which leads to affection of the skeletal muscles. No changes in the central nervous system are observed. The disease begins in childhood or adolescence and develops slowly.

Symptoms. In course of time the atrophy of muscles becomes increasingly more noticeable. This gradually leads to motor disturbances to the point of total inability to move. The muscles

grow thin or, in so-called pseudohypertrophic dystrophy, enlarge by proliferation of fatty tissue in place of the destroyed muscle fibres. As a rule, the muscles of the proximal parts of the extremities (muscles of the pelvic and shoulder girdles) are affected the most. The patients have a waddling gait (duck or myopathic gait), difficulties in running and climbing stairs, and are easily fatigued by physical activity. The tendon reflexes are either entirely absent or considerably weakened as a result of atrophy of the corresponding muscles. Owing to the weakness of the trunk muscles the patients have a peculiar standing posture—sharply protruding abdomen and big forward curvature of the spine (Fig. 29). The atrophy of the deltoid and scapular muscles causes the shoulders to droop and the scapulae to project posteriorly (winged scapulae). In advanced cases the patients are either unable to rise unassisted or rise with great effort, performing a number of auxiliary movements in doing it. For example, to rise from a recumbent position, the patient first turns over to a prone position, then, resting on his hands, rises to his knees, extends his legs in the knees and, lastly, gradually extends his trunk.

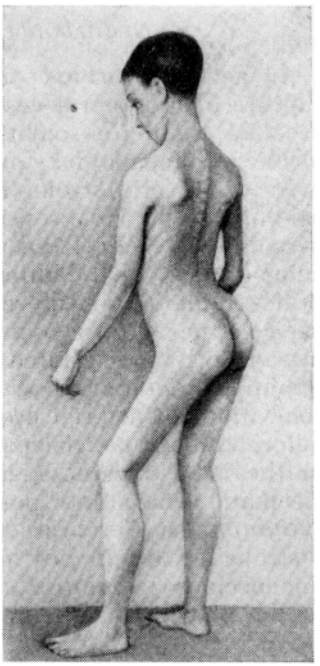

Fig. 29. Posture of patient with progressive muscular dystrophy

The cause of progressive muscular dystrophy is not entirely clear. The disease is often transmitted through heredity.

Treatment. In view of the signs of carbohydrate metabolism disturbances the patients are often treated with insulin and adrenalin. Vitamins E, B_1 and B_{12}, adenosinetriphosphoric acid (ATP) and roentgen therapy are prescribed.

Stimulants, such as proserine, galanthamine, dibazol and securinine, are also used.

Disturbances in Cerebral Circulation

An acute disturbance in cerebral circulation accompanied by rupture of a cerebral vessel (hemorrhages without injury to the vascular wall are sometimes also observed) is called an apoplectic stroke, apoplexy or simply a stroke.

An apoplectic stroke is a common disease occurring at the age of 50-60. This severe and dangerous condition overtakes persons suffering from arteriosclerosis and hypertensive vascular disease. In the latter case an acute disturbance in the cerebral circulation—hemorrhage or vascular spasm—may set in even in the absence of marked arteriosclerosis. Apoplexy is not infrequently precipitated by great emotional stress or physical strain. These factors are conducive to considerable variations (elevation) of arterial pressure. Only in some cases, several days before the stroke, the patients complain of increased heaviness in the head, dizziness, headache, numbness in the arms, poor sleep and general indisposition.

Symptoms. Cerebral hemorrhage usually occurs suddenly ("stroke") without any presage. The patient falls, often totally unconscious (comatose state). The face and neck turn purple with a bluish tint. The loss of consciousness may immediately be

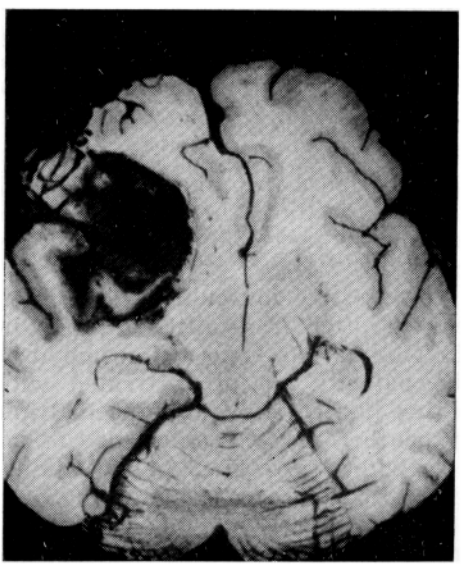

Fig. 30. Hemorrhagic focus in the left hemisphere

followed by convulsive twitchings of the arms, legs and muscles of the face. Respiration is slow, deep and often bronchial. The pulse is slow and tense. Involuntary urination and defecation are frequently observed. All reflexes are absent. The pupils are dilated and do not react to light. This condition with total loss of consciousness lasts from several hours to 1½-2 days. Usually the longer the patient does not come to, the graver the prognosis. Subsequently the patient begins to react to environment. In response to a question the patient opens his eyes and stares, sometimes trying to answer. At this time the patient is not as yet completely conscious; he is dazed. The respiratory and pulse rates increase. Certain nervous symptoms, for example, weakness of an arm or leg with a change in their muscle tone, asymmetry of the face, the Babinski's sign and Oppenheim's reflex, impaired sensitivity, speech disturbances, etc., may be observed during the same period. By considering the symptoms it is possible already at this time to determine the site of the hemorrhage (Fig. 30). This is most commonly the region of the internal capsule because it is here that the vessels most frequently undergo change and rupture more easily on variations in arterial pressure.

For a clearer insight into the symptoms it should be remembered that in the internal capsule (a small area) there is an accumulation of nerve fibres which, through the spinal cord, connect the motor and sensory areas of the cerebral cortex with the periphery. The motor (pyramidal) tract which passes through here undergoes decussation in the medulla oblongata so that the motor fibres run from the left hemisphere to the right half of the body and from the right hemisphere to the left side of the body. That is why in case of a hemorrhage into the right hemisphere (into the region of the internal capsule) it is the left half of the body that will be paralysed. A hemorrhage into the left hemisphere will cause, in addition to paralysis of the right arm and leg, speech disorders (aphasia). This is due to the fact that the systems connected with speech are located only in the left hemisphere.

There are different forms of aphasia: (1) motor aphasia when the patient loses the ability to pronounce words but understands those spoken to him; his speech contains many errors and is very difficult or impossible to understand; (2) sensory aphasia in which case the patient can speak but does not understand what is said to him; (3) amnesic aphasia in which the patient recognizes objects, knows how to use them, etc., but cannot name them. The various forms of aphasia rarely occur alone; mixed aphasias are most commonly observed.

Fig. 31. Wernicke-Mann posture of patient with right-sided hemiplegia

Thus apoplexy most frequently results in paresis or paralysis of the right or left half of the body (hemiparesis or hemiplegia). Hemiparesis is characterized by the following symptoms: weakness of the arm and leg muscles, increased muscle tone and tendon reflexes in the arms and legs, and pathologic reflexes. Upon showing the teeth its corner on the healthy side of the mouth turns up. On being put out the tongue moves to the side of the paralysed extremities. Sensitivity to pain is sometimes diminished on the paralysed side. The aforementioned increase in muscle tone is not equally distributed through all the muscle groups. For example, increased muscle tone predominates in the flexors of the arm and the extensors of the leg. That is why a characteristic posture is observed in hemiparetic patients, namely, the arm is adducted to the trunk and flexed in the elbow and wrist, the hand is clenched, and the leg is extended in all joints. This is the so-called Wernicke-Mann posture (Fig. 31).

The clinical picture of apoplexy resembles that of obstruction of a cerebral vessel as a result of *thrombosis* or *embolism*. Diminished arterial pressure and increased blood clotting are factors conducive to development of thrombosis.

Unlike a hemorrhage, thrombosis develops slowly, over a period of several hours. It is often preceded by headache, dizziness, a sensation of everything going dark before the eyes, etc. The signs of focal cerebral affection (hemiparesis, speech disturbances, etc.) appear slowly; the consciousness is affected to the point of a deep daze, the state of sopor. The blood pressure is diminished and the patient's face turns pale. Thrombosis most commonly develops in middle-aged people.

Embolism of cerebral vessels occurs, as a rule, suddenly, without any presage. Often the first sign of embolism is a convulsive syndrome involving mainly one extremity or one half of

the body. Embolism develops for the most part in young people suffering from rheumatic heart disease (heart diseases, endocarditis). The blood pressure is normal or diminished. Embolism most commonly affects one extremity or gives rise to hemiparesis. It may be the result of penetration of air into the circulatory system—so-called air embolism. It may arise in cases of injury to large vessels, blood transfusion, intravenous injection or abrasion. Injury to extremities involving damage to the osseous tissue may give rise to fat embolism.

Treatment of cerebral hemorrhage. Complete rest is indicated during the acute period of the disease. The patient must be put to bed, his head resting on a high pillow, an ice bag on the head and hot water bottles (not too hot, to prevent burns) or mustard plasters applied to the feet. The room must be well aired; it must be neither hot nor stuffy.

It is inadvisable to transport the patient during the first days following an apoplectic stroke.

In cases of high arterial pressure it is recommended to bleed the patient by means of venesection or venipuncture, abstracting up to 300 ml of blood, or by applying 3-4 leeches behind each ear. The intestines must be evacuated by means of an enema; no high enemas must be made, however; nor must the patient be lifted or roughly turned. The patient's respiration and pulse must be carefully watched.

In the event of appearance of marked cardiovascular disorders the patient is given injections of camphor (1-2 ml of a 20 per cent solution) and administered other cardiacs—cordiamine (nickethamine), corazole (pentylenetetrazole). To prevent bedsores and development of congestive pneumonia, it is necessary from time to time carefully to change the patient's position in bed and see to it that he is not left long in one position. The skin in the region of the sacrum, small of the back, buttocks and lower extremities must be regularly and thoroughly rubbed down with spirit of camphor. It is desirable to place the patient on a rubber ring or a water mattress. The patient must not be allowed to change his own position in bed or exert any physical efforts. During the first days following an apoplectic stroke the patient must be given only liquid food. If the patient swallows with difficulty, he must be fed very carefully, slowly and in small portions since, in such cases, the patient may choke on the food and the latter may gain entrance into the respiratory tract, giving rise to inflammatory phenomena in the lungs.

Treatment with iodine preparations (a tablespoonful of a 3 per cent solution of potassium iodide 3 times a day) may be insti-

tuted within 7-10 days, after disappearance of the acute phenomena. Light massage of the paralysed extremities and passive movements in all the joints of the affected arm or leg should be started at about the same time. But the patient must not be tired.

The patient must be kept on a light diet, mainly dairy and vegetable, and must not be given seasoned or salted food or too much liquid, especially strong tea or coffee. Alcoholic drinks and smoking are absolutely prohibited. After an apoplectic stroke the patient must be kept in bed for several weeks. Within 3-4 weeks (this is strictly individual), if the patient feels good and no disturbances in heart action are observed, he may be allowed to sit up in bed for a few minutes, this period being gradually increased. The treatment of the effects of hemorrhage consists for the most part in physiotherapy—massage, passive and active exercise. A course of 15-20 sessions of ionization with iodine by the Bourguignon method is prescribed at this time.

Neurosurgical methods of treating apoplexy have now come into practice.

In the treatment of thrombosis the patient must be given complete rest and administered cardiacs and vasodilators (for example, aminophyllin and theophyllin). On the physician's prescription the patient is given 100 mg of dicoumarin 3 times a day. In this case it is necessary to control the prothrombin time.

Aid in cases of embolism consists in complete rest and administration of cardiacs (Valeriana and Convallaria preparations, and adonilene [extract of Adonis]). No intravenous administration of drugs is allowed.

Encephalitis

Encephalitis is inflammation of the brain. The disease may be caused by various infections (viruses, microbes). All encephalitides are divided into two large groups—primary and secondary. The first group includes epidemic (lethargic) encephalitis, tick-borne encephalitis, etc.

Secondary encephalitides include inflammations of the brain following general infectious diseases (measles, pneumonia, etc.).

Epidemic Encephalitis

This disease has been named epidemic encephalitis because of the 1917-1928 world-wide epidemic. It is also known as lethargic encephalitis because pathologic, excessive sleepiness or

drowsiness is one of its most characteristic symptoms. This encephalitis has two basic stages—acute and chronic.

Symptoms. During the acute period the disease is marked by a rise in body temperature to 38°C; in some cases the temperature is normal. The elevated temperature lasts an average of 15-20 days. Sharp sleep disorders, most commonly manifested in constant drowsiness, are observed during the same period. The patients sleep almost around the clock. It is only with difficulty that they can be awakened for meals and administration of medicines. The awakened patient almost immediately lapses into a drowsy state. Subsequently sleepiness may be replaced by stubborn insomnia or a peculiar perversion of the sleep rhythm —sleepiness in the daytime and insomnia at night. In addition to sleep disorders, this period is marked by dysfunction of some of the cranial nerves, the oculomotor (3rd pair) and abducens (4th pair) nerves being most commonly affected. This is manifested in drooping of the upper eyelid on one or both sides (Fig. 32)—*ptosis*—and double vision—*diplopia*. Sometimes the pupils are of unequal diameter—*anisocoria*. Some cases are characterized by dizziness. Respiration becomes accelerated. The disease may involve acute mental disturbances—hallucinations, excitement, etc. Sometimes the entire acute period is marked merely by subfebrile temperature without sufficiently clear eye symptoms and is regarded as protracted influenza or some other infection.

The second, chronic stage sometimes develops soon after the acute stage, but more frequently several months and even years later. This stage of the disease is known as *parkinsonism*. It is marked by sluggishness and inactivity, the muscle tone being gradually increased. Changes in mimetic movements are particularly noticeable. The countenance becomes fixed, the face assuming a mask-like appearance. The skin is lardaceous. The patients move about less and less, and may sit for a long time without changing their posture. In walking the arms fail to move synkinetically. The patients assume a characteristic posture: the head and trunk are somewhat bent forward, the arms are adducted to the body and are flexed in the elbows (Fig. 33). The gait is slow, with small and sometimes shambling steps. The patients speak slowly and in a low voice. The muscle tone is considerably increased. Along with the general rigidity and inactivity the patients often exhibit a forced fine tremor of the head, hands and fingers. Excessive salivation is not infrequently observed.

Certain mental disturbances may be noted at this stage; these are manifested in apathy, absence of initiative and weakness

Fig. 32. Bilateral ptosis in patient with epidemic encephalitis

Fig. 33. Posture and countenance of patient affected with parkinsonism

of memory. Sometimes the patients are importunate, keep asking the same question or voicing the same complaint, etc. Mental defects are sometimes observed in children who have survived encephalitis; these defects are manifested in unbalanced behaviour, impulsiveness, propensity for mendacity, vagrancy, cruelty and amoral acts. These cases are regarded as peculiar, psychopathic development of the personality.

Examination of the brains of people who have died of encephalitis reveals the changes of an inflammatory character mainly in subcortical ganglions and in the walls of the third ventricle.

Cause. The disease is caused by a filtrable virus.

Treatment. During the acute period the patient must be kept in bed and be given intravenous injections of 5-10 ml of a 40 per cent urotropin solution daily or every other day (a total of 40-50 injections), 5-10 ml of a 40 per cent glucose solution with ascorbic acid, penicillin, streptomycin, biomycin (chlortetracycline) and tetracycline; 5 ml of a 0.5-1 per cent trypaflavin (acriflavine) solution daily or every other day (10-15 injections) or 5-10 ml of salitropin are administered intravenously. Convalescents' serum is injected intramuscularly in increasing doses (from 5 to 30 ml) with 3-4 days intervals. Vitamins B_1 and C are also prescribed. Caffeine and fenamine sulfate are given in cases of considerable drowsiness and soporifics, for insomnia. Plenty to drink, 1,000-2,000 cc of oxygen subcutaneously or inhalations are recommended.

Scopolamine hydrobromide is recommended during the chronic stage, as a symptomatic substance which diminishes muscular tension and general rigidity.

Rp. Scopolamini hydrobromici 0.01
Aq. destill. 150.0
MDS. 1 teaspoonful b.i.d. or t.i.d.

A belladonna root decoction is used according to the following prescription:

Rp. Decocti vini radicis Atropae Belladonnae
5% 100
DS. 1-1 ½ teaspoonfuls for the night

Diathermy for the head, tropacine (ester of diphenylacetic acid hydrochloride), artane, pentaphene and roentgen therapy are also prescribed.

Tick-Borne Encephalitis
(Russian spring-summer or Russian Far-East encephalitis)

The vector of the virus which causes this form of primary encephalitis is the wood tick *Ixodes* found in the forest regions

of the Far East, Siberia, Urals and the European part of the U.S.S.R. The ticks reproduce intensely during the spring and summer months, infections being therefore observed during this season. Rodents (hares, squirrels) and certain birds are carriers of the virus. After sucking the blood of infected animals the tick (vector) bites man and infects him. This disease is not transmitted directly from man to man. It was first studied by Soviet scientists (A. Panov, L. Zilber, M. Chumakov, Y. Levkovich et al).

Symptoms. The first signs of the disease appear 3-8 days after infection. The disease sets in acutely with headache, indisposition, weakness and nausea. The temperature rises to 39-40°C and persists on this level for 6-10 days. The face is flushed and throat is inflamed. In some cases an eruption breaks out on the body. Catarrhal phenomena and sometimes bronchopneumonia are observed in the upper respiratory tract. Meningeal symptoms —tension of occipital muscles and Kernig's sign—are noted. Consciousness is sometimes deeply disturbed. Since the pathologic process is most commonly and predominantly localized in the upper cervical segments of the spinal cord (anterior horns), flaccid, atrophic paralyses of the neck muscles—"drooping head" (Fig 34) and the shoulder girdle not infrequently develop. Flac-

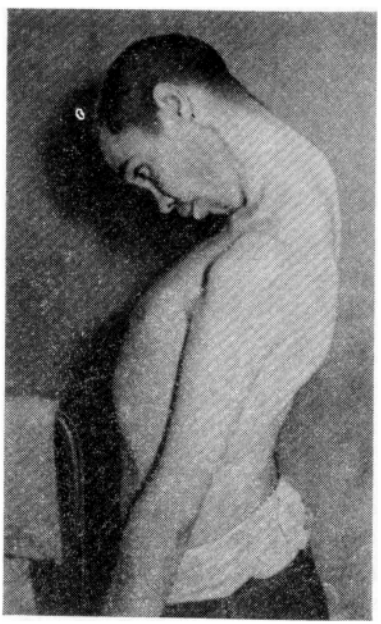

Fig. 34. "Drooping head" in tick-borne encephalitis

cid, atrophic paralyses of the arm muscles appear and are often combined with lesions in certain nuclei of cranial nerves.

Tick-borne encephalitis sometimes gives rise to a special form of epilepsy known as Kozhevnikov's epilepsy. This form of epilepsy is characterized by continuous muscular twitchings in some part of the body. The twitchings gradually and periodically increase and develop into a general epileptic seizure.

Post-mortem examination of such patients reveals inflammatory changes in the brain and spinal cord. They are particularly pronounced in the grey matter of the cervical part of the spinal cord, the nuclei of the medulla oblongata, and in the subcortical ganglions, and less so in the grey and white matter of the brain. Petechial hemorrhages and small areas of malacia are found in the same places. The pia is edematous and extremely hyperemic.

Treatment. Hospitalization of all patients and strict confinement to bed are imperative. Until the temperature drops the patients are given lumbar injections of 5-10 ml of blood serum of persons who have survived this disease (convalescents' serum), or intramuscular injections of 40-50 ml of the same serum for a period of 5-6 days. When indicated cardiacs are administered; in cases of disturbed respiration—cytitone and lobeline are given. Repeated lumbar punctures are sometimes resorted to. Intravenous injections of 20-30 ml of a 40 per cent glucose solution and subcutaneous injections of 1,000-2,000 cc of oxygen every other day are administered. Injections of vitamins B_1, B_{12} and C, and proserine and dibazol are widely used. General robarant treatment and careful nursing are indicated. Physiotherapy—iontophoresis with potassium iodide, diathermy, kinesitherapy and massage are helpful.

Prophylaxis. Extermination of ticks is one of the most important preventive measures. People working in areas in which there is danger of infection must protect the exposed parts of the body from tick bites. Special nets covering the face and neck and special work clothes are used for this purpose. Various repellents applied to the exposed parts of the body are also used for the same purpose. A tissue vaccine (Y. Levkovich, G. Zasukhin) is administered subcutaneously (1 ml 2-3 times a day) as a prophylactic.

Secondary Encephalitis

Secondary encephalitides are complications of a number of infectious diseases (influenza, scarlet fever, measles, parotitis, typhoid fever, typhus, etc.). The encephalitides developing after infectious diseases are also called postinfectious encephalitides.

Symptoms. Secondary encephalitis is usually marked by elevated temperature and a number of symptoms indicating brain lesions—headache, dizziness, nausea, sometimes disorders of consciousness, and general restlessness. The symptoms are determined by the part of the brain affected. For example, lesions in the brain stem are characterized by disturbances in the cranial nerves, lesions in the vestibular apparatus—by dizziness and persistent nausea, etc. Paralyses, pareses and various forms of aphasia may develop. Secondary encephalitides most commonly occur in childhood and unfavourably affect the child's mental faculties (retarded intellectual development). Epileptiform seizures subsequently develop in some cases.

Treatment. The basic infectious disease is treated during the acute stage. Urotropin, penicillin, infusions of a 40 per cent glucose solution and vitamin B_1 are prescribed on the appearance of cerebral disturbances.

Infectious Chorea (Chorea Minor)

Chorea minor is due to a rheumatic affection of the brain, the pathologic process involving mainly the subcortical ganglions. It is essentially an encephalitis of rheumatic nature, for which reason chorea is often combined with a rheumatic affection of the heart. The disease is observed mainly in childhood (5-10 years of age) and most commonly affects girls.

Symptoms. The disease develops gradually. The first signs are absent-mindedness, excessive irritability, and unstable mood. The child's behaviour alters; the child begins to grimace and cannot keep still in school or at home; the child's handwriting changes. Little by little the child's movements become irregular and involuntary; they are usually sweeping, purposeless movements, involving different groups of muscles.

Development of marked choreic hyperkinesias is observed 1-2 weeks after the onset of the disease. The movements are abrupt and unexpected. The patients swing their arms, jerk their heads, open and close their mouths, stick out their tongues, shut and open their eyes, and develop speech disorders. They cannot sit still, but keep getting up, jumping up, etc. While in bed, they toss about, as though thrown around, striking against the bed, walls, etc. They cannot eat unassisted and find it difficult to eat even from the hands of the attending personnel. During sleep the hyperkinesias subside.

During the illness the patients lose weight. Their muscle tone is diminished. Chorea lasts an average of 2-3 months. It may

recur, especially in spring and autumn. The prognosis is generally good, but some cases may be protracted. Severe heart lesions are sometimes observed.

Treatment. Strict bedrest. Since protracted hyperkinesias tire and emaciate the patients, it is necessary to prolong their sleep, for which purpose they are given hypnotics and sedatives—luminal, bromides—and warm baths. The drugs prescribed include penicillin, pyramidon, urotropin, sulfonamides, butadione and large doses of sodium salicylate, together with adonilene and bromides, as in the following prescription

Rp. Adonileni 4.0
Natrii salicylici 8.0
Natrii bromati 4.0
Aq. Menthae 200.0
MDS. 1 tablespoonful t.i.d.

Children 5-10 years old are given 1 teaspoonful of this mixture 3-4 times a day; children 10-12 years old—1 dessertspoonful 3 times a day; children past 12 years of age—1 tablespoonful 3 times a day. Arsenic preparations, for example, Fowler's solution, 5-10 drops 3 times a day are indicated. Cortisone and adrenocorticotropic hormone in combination with ascorbic acid are also used.

Positive results in the treatment of chorea have lately been obtained by electronarcosis in combination with drug therapy. During intense hyperkinesias it is necessary to watch that the patient does not fall and hurt himself; the sides of the bed should be padded. Sometimes the patients should be fed from the spoon by the attending personnel as they throw their food about and cannot eat unassisted.

Meningitis

Meningitis is inflammation of the meninges. Primary (epidemic) and secondary (tuberculous and purulent) forms of meningitis are distinguished. All forms of meningitis have a number of common symptoms, the most constant of which is *headache*. As a rule the headache is disseminated and dependent on stimulation of the sensory nerves in the meninges. *Nausea* and *vomiting* are also very frequent manifestations of meningitis and are usually independent of food intake. *Occipital rigidity*—tension of the posterior muscles of the neck caused by stimulation of the spinal nerve roots—is another constant symptom. In response to the bending of the head the posterior group of neck muscles tenses and resists the bending, i.e., becomes rigid (Fig. 35). A very important and frequently observed manifestation of the disease is *Kernig's sign*. This sign is evoked as follows: the

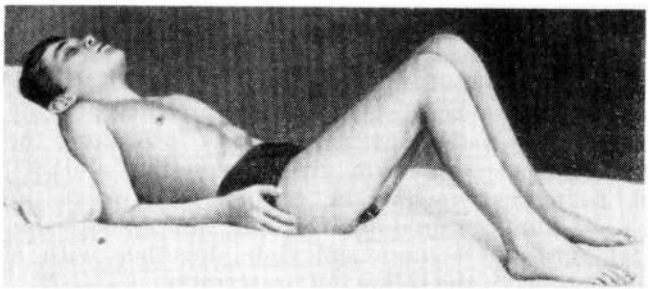

Fig. 35. Rigidity of occipital muscles in meningitis

patient is placed supine with one leg flexed in the hip and knee joints and an attempt is made to extend the flexed leg in the knee; as the leg is being extended the nerve roots in the spinal cord are stretched and irritated with resultant involuntary tension of the flexors of the shank and failure to extend the leg (Fig. 36).

Brudzinski's neck and contralateral leg *signs* are often positive. The neck sign consists in the fact that passive flexion of the head is followed by flexion of both thighs and legs; the contralateral leg sign—passive flexion of one thigh and knee is accompanied by flexion of the opposite thigh and knee.

The position of the meningitis patient is also characteristic—

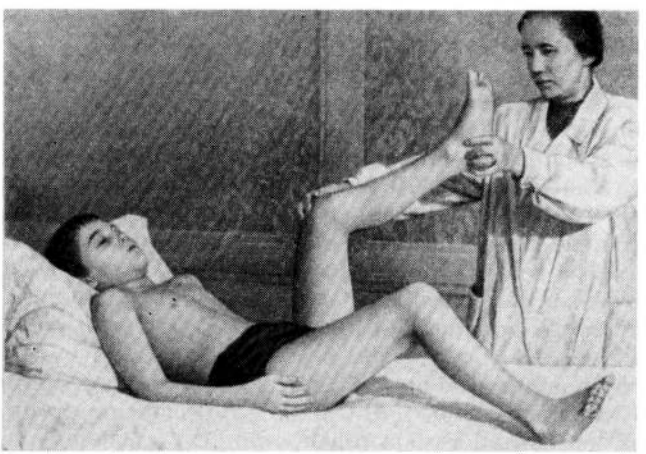

Fig. 36. Testing for Kerning's sign

he lies on a side, his head thrown back and legs flexed and pressed against the abdomen. The symptoms very often include intolerance of light *(photophobia),* abnormal acuteness of the sense of hearing *(hyperacusia)* and excessive sensitivity to pain *(hyperalgesia).* As a rule, the pulse is slowed, which is associated with stimulation of the vagus nerve. Not infrequently certain affections of cranial nerves can be observed—strabismus, ptosis of the eyelids, double vision, facial asymmetry, etc. The blood shows neutrophilic leukocytosis (15,000-20,000) and a faster erythrocyte sedimentation rate. Examination of the spinal fluid reveals elevated pressure, increased protein and a large number of cells. Disturbances in consciousness are observed in severe cases. Sometimes the patients are excited. The temperature is high. The foregoing signs are in some measure observed in all forms of meningitis.

Epidemic Cerebrospinal Meningitis (meningitis cerebrospinalis epidemica)

The causative agent on this meningitis is the meningococcus which gains entrance to the meninges from the nasopharynx. The infection is transmitted by the droplet method.

The disease is epidemic. Most commonly the epidemics arise in winter and spring months. The carriers of the infection are persons who have survived the disease and those who were in contact with meningitis patients, although they themselves may not be affected. The disease most frequently attacks children and adolescents. An attack of epidemic meningitis confers stable immunity.

Symptoms. The onset of the disease is acute and sudden. It begins with marked chills, headache, nausea and high temperature. The general cerebral symptoms rapidly increase. The consciousness is impaired. Meningeal symptoms are clearly marked. Examination of the spinal fluid reveals a considerable increase in cells (several hundred and higher per 1 cu mm) and protein; bacteriological examination—the meningococcus. The height of the disease is sometimes characterized by convulsive seizures. This is an ominous sign indicative of gravity of the disease and possible lethal results. The disease lasts an average of 3-4 weeks, sometimes somewhat longer. Before the appearance of sulfonamides and penicillin in medical practice epidemic meningitis was responsible for high mortality. Today the death rate is negligible.

Treatment. The sooner the disease is treated with sulfonamides (sulfathiazole, sulfadiazine) and penicillin, the sooner it is cured

and the fewer the complications. The treatment begins with large doses of sulfonamides. For example, the first dose for an adult is 2 g. Following this the patients are given 1 g every 4 hours. The total dose taken the first day is 7 g, the second day—6 g, the third and fourth days—4 g each, and the subsequent 2-3 days—2 g each.

Children up to 2 years of age are prescribed 0.3 g/kg sulfonamides for the first 3-4 days of the illness and 0.2 g/kg for the following 4-8 days. Since the patients frequently vomit or are unconscious and cannot swallow, the sulfonamides are administered intravenously or endolumbarly. The solution is prepared according to the following prescription:

Rp. Norsulfazoli solubilis 10% 20.0
Sterilis!
DS. For intravenous injections

The solution is injected only into the vein for its penetration under the skin may produce tissue necrosis.

A considerable improvement in the patient's condition is observed already on the 2nd or 3rd day of treatment with sulfonamides. However, the treatment must be carried on to the end in order to avoid aggravation or complication of the process. The treatment includes intramuscular administration of penicillin—100,000-200,000 u every 4 hours for 10-15 days. The first "shock" dose of penicillin for adults must be 1,000,000-2,000,000 u. In cases where penicillin treatment proves ineffective, streptomycin and levomycetin (chloramphenicol) are prescribed.

The symptomatic agents include an icebag on the head and analgesics. Chloral hydrate enemas and luminal are prescribed in cases of convulsive seizures.

Careful nursing of the patient is very important. The patient must not be unnecessarily disturbed because the excessive sensitivity of his skin may lead to excitement and even to a convulsive seizure. The wards with such patients must be far from noisy places and must not be too brightly illumined. A light and mainly liquid diet is indicated. The patient's mouth must be washed with a weak potassium permanganate solution. Warm baths are given to reduce muscular tension. It is necessary to watch the functioning of the patient's intestines and bladder. Every epidemic meningitis patient must be hospitalized.

Prophylaxis. It is very important to explain the routes of spread of this infection to the population. Persons who nurse patients and those who have had contact with patients must strictly observe the rules of hygiene. In the event of an epidemic outbreak all children who have had contact with patients must

be given sulfonamides for several days for purposes of prophylaxis. The patient's room and personal effects must be disinfected, for which purpose it is enough to wash the walls and floor with hot water and to iron the personal effects with a hot iron.

Tuberculous Meningitis (meningitis tuberculosa)

This form of meningitis is also most commonly observed in children and adolescents. Usually the patient's anamnesis contains indications of a past attack of pulmonary tuberculosis, tuberculosis of the bronchial glands or tuberculosis of other organs.

Symptoms. The disease develops gradually. The first signs are headache, general indisposition, weakness, irritability, loss of appetite and slight rises in temperature (37.2-37.8°C). In course of time the headaches become more intense, sleep is disturbed, the skin pales, nausea appears and the patient vomits. All these signs may be observed over a period of 1-2 weeks, following which meningeal symptoms come to the fore. The spinal fluid is transparent, slightly opalescent or somewhat yellowish, and contains much protein and a large number of lymphocytes. Allowed to stand in a test tube it gives rise within 24-48 hours to a thin film in which tubercle bacilli are sometimes found. At this time the patient's temperature rises to 38-39°C, his consciousness is periodically clouded, and death often occurs by the end of the 3rd or 4th week from the onset of the disease if the disease is not treated vigorously. Formerly every case of tuberculous meningitis was considered absolutely hopeless and ended lethally. Owing to the latest achievements in the treatment of tuberculosis this is no longer observed.

Treatment. All tuberculous meningitis patients should be hospitalized. Streptomycin is administered subarachnoidally and intramuscularly in combination with PAS (paraaminosalycilic acid) and phthivazide (isonicotinic acid hydrazide derivative). The disease being detected early and its course being mild, subarachnoid injections of streptomycin may be avoided and the treatment may be limited to intramuscular administration of streptomycin in combination with PAS and phthivazide per os. The average 24 hours dose of streptomycin administered intramuscularly to children of up to 3 years of age is 200,000-250,000 u; for children of 4-7 years of age the dose is 250,000-300,000 u; for those aged between 8 and 12—300,000-500,000 u; the daily dose for adults is 500,000-1,000,000 u.

The daily dose of streptomycin, dissolved in 2-3 ml of a sterile

saline solution or in 2-3 ml of a sterile 0.25-0.5 per cent novocaine solution is administered intramuscularly in two portions with a 12 hours interval. Only calcium chloride complex of streptomycin is injected subarachnoidally (endolumbarly or suboccipitally). Before endolumbar introduction of streptomycin 5-10 ml of cerebrospinal fluid should be withdrawn. The average daily dose of streptomycin for endolumbar injections is 20,000-30,000 u for children up to 3 years of age, 30,000-50,000 u for those aged from 4 to 7, and 50,000-100,000 u for children between 8 and 12 years of age. The adult dose is 100,000 u.

Rp. Streptomycini calcii chlorati 100,000 u
D.t.d. No. 6
S. To be dissolved in 2 ml of sterile bidistilled water for endolumbar injections; adult dose—100,000 u; for a child aged 8—1 ml (50,000 u)

The first 10-15 endolumbar injections are given daily, with a day interval following 6-7 injections. The treatment lasts averagely for 3-4 months. Good results have been obtained by combined treatment with streptomycin and PAS or phthivazide. The PAS doses in this treatment are as follows: children and adolescents are given 0.2 g per kg of body weight daily in three portions. The course of treatment is 5-6 months with a weekly interval of 1-2 days. Phthivazide for children is prescribed in daily doses of 20-30 mg/kg and is given in 3-4 portions; the adult dose is 0.5 g 2-3 times a day, the course of treatment being up to 6 months.

In case of intolerance of subarachnoid injections of streptomycin in combined therapy (streptomycin intramuscularly, PAS and phthivazide per os), endolumbar injections of saluzid (isoniozid preparation) are recommended. Vitamins, calcium preparations and sedatives are prescribed in addition to the aforementioned therapy. High-calorie diet and proper care are indispensable. The course of treatment being completed, the patients should be sent to special sanatoriums and open-air schools in forest areas.

Prevention consists in systematic treatment of tuberculosis of internal organs.

Purulent Meningitis (meningitis purulenta)

Purulent meningitis is, like tuberculous meningitis, a secondary disease and develops as a complication in purulent diseases of the ears and nasopharynx, and other purulent processes of the face and head. The pyogenic microbes (most commonly

the staphylococcus and streptococcus) gain entrance to the meninges through blood vessels and lymphatics.

The symptoms of the disease resemble those of epidemic meningitis (see p. 90).

Treatment. Penicillin, streptomycin, biomycin (chlortetracycline) and other antibiotics, as well as sulfonamides are administered. The main preventive measure is timely and radical treatment of the underlying purulent disease.

Acute Serous Meningitis (meningitis serosa acuta)

Serous meningitis may be primary (lymphocytic choriomeningitis and meningitis caused by the Coxsackie virus and ECHO) and secondary, arising as a complication of various general infectious diseases, for example, pneumonia, measles, typhus, influenza, mumps, etc.

Symptoms. The disease begins with an intense headache (sometimes paroxyzmal), elevated temperature and general indisposition. Meningeal symptoms soon appear in addition to these initial phenomena. As a rule, the disease runs an acute and usually benign course. Nevertheless there are individual cases with repeated exacerbations. The disease is very rarely protracted. In these cases hydrocephaly may develop. On lumbar puncture the cerebrospinal fluid exudes under high pressure, the fluid is transparent but contains increased amount of protein and lymphocytes.

Treatment. Injection of a 40 per cent urotropin solution with glucose, magnesium sulfate with glucose, penicillin, repeated punctures and B_1, B_{12}, C vitamins. Thorough treatment of the basic disease is imperative in secondary meningitis. Since primary virus meningitides are highly contagious, hospitalization of each patient is necessary for a period of up to a month.

Syphilitic Meningitis (meningitis luetica)

Symptoms. Syphilitic meningitis is characterized by a gradual increase in meningeal symptoms—headache, dizziness, nausea, etc. Since this form of meningitis most commonly involves the meninges of the base of the brain, the clinical picture shows increasing affection of cranial nerves, particularly the 2nd, 3rd and 6th pairs. Nocturnal intensification of headaches is a characteristic sign. In addition to the meningeal symptoms and paralyses of cranial nerves, signs of lesions in pyramidal

tracts—weakness in the extremities, irregular and pathologic reflexes—are sometimes observed. Febrile phenomena are usually absent. The Wassermann blood and cerebrospinal fluid test and the presence of syphilis in the patient's anamnesis are very important for ascertaining the diagnosis.

The treatment is specifically antisyphilitic.

Cerebral Tumour
(Tumor Cerebri)

Tumours may develop in any part of the brain. Sometimes they are found in the white matter of the cerebral hemispheres and the cerebellum (Fig. 37). Histologically cerebral tumours vary very widely. An important contribution to the theory of tumour structure has been made by L. Smirnov. *Glioma* is the most common cerebral tumour. Like the tumours of other organs, some cerebral tumours are limited in growth (benign tumours), while others are penetrative, infiltrative (malignant tumours).

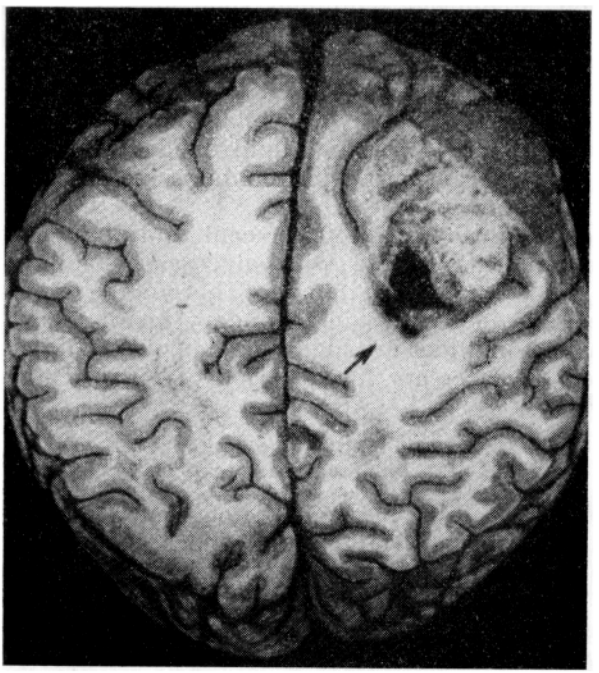

Fig. 37. Tumour in the white and grey matter of the brain

Symptoms. A cerebral tumour impairs the circulation of blood and cerebrospinal fluid, which leads to elevated intracranial pressure. Two groups of symptoms are distinguished in the clinical picture: *general cerebral* and *local* or focal. The general cerebral symptoms include persistent *headache* often accompanied by *vomiting,* the vomiting often taking place on an empty stomach. Most frequently it coincides with intensification of the headaches. The third general cerebral symptom is the appearance of *papilledema.* In course of time these changes in the optic nerves may lead to various degrees of their atrophy and impair the patient's vision to the point of total blindness.

In cases of cerebral tumours roentgenography sometimes shows important signs of elevated intracranial pressure—increased digital impressions, thinning of cranial bones, increased vascular pattern, separation of sutures, enlargement of the sella turcica and expansion of its aditus. The general cerebral signs also include dizziness, mental disturbances, convulsive seizures, and changes in the cerebrospinal fluid.

The focal symptoms depend on the localization of the tumour in the brain. For example, a tumour in the cerebellum gives rise to a cerebellar gait, in the occipital lobe—to some impairment of vision. Other localizations result in various pareses, paralyses, speech disorders, dysfunction of cranial nerves, etc. These focal symptoms play a very important part in determining the localization of cerebral tumours which is of particular importance in deciding the question of surgical intervention. On appearance of general cerebral symptoms an urgent examination by a specialist is imperative since the sooner the tumour is diagnosed, the more favourable the prognosis in surgical treatment. Cerebral tumours often give rise to mental disturbances—sluggishness, apathy, impaired memory, excessive sleepiness, stupor and sometimes syncopal states or convulsive, epileptiform seizures. The pulse is often slow. The course of the disease depends on the character of the tumour. If the tumour is malignant the disease develops rapidly and sometimes even stormily. Such a course of the disease is observed, for example, in spongioblastoma multiform and cancer metastases in the brain. Benign tumours are characterized by a slow development of the disease and gradual increase in the symptoms.

Treatment. Surgical intervention is the only radical method of treatment. In cases where the localization of the tumour precludes surgical treatment or the disease is too far advanced an operation of decompression is sometimes performed; this temporarily alleviates the patient's suffering. Symptomatic treatment with dehydrating preparations (magnesium sulfate, cal-

cium chloride, mercusal) and analgesics is also resorted to; luminal, hexamidine, etc., are used for convulsive seizures.

In some tumour cases, for example, adenoma of the hypophysis, positive results have been produced by roentgen therapy. This may also prove beneficial in the treatment of certain other inoperable tumours.

Cerebral tumour patients need careful watching both before and after the operation because they may suddenly develop severe cerebral disorders which require urgent medical aid. To prevent severe and dangerous complications, especially if the tumour is localized in a posterior cerebral fossa, lumbar punctures may be made only with the patient in a recumbent position and after consultation with a specialist in order to prevent severe and dangerous to life complications, especially if the tumour is localized in the posterior cranial fossa.

Cerebral Abscess
(Abscessus Cerebri)

Cerebral abscesses are the result of penetration of pyogenic microbes into cerebral tissue. Usually this disease develops after an open cranial injury followed by infection of the wound (traumatic abscess). An abscess often forms in a temporal lobe of the brain in cases of suppurative inflammation of the middle ear (otogenous abscess) or the paranasal sinuses. Some abscesses arise in connection with transmission of purulent infection by the blood from a pyogenic focus in the internal organs (metastatic abscess). Metastatic abscesses are most commonly observed in pulmonary disease (pulmonary abscess, bronchiectasis, etc.).

Symptoms. The clinical manifestations of a cerebral abscess depend on its size, rapidity of its development and its localization. Cerebral abscesses are characterized by headache, dizziness, nausea, sometimes persistent subfebrile rises in body temperature, leukocytosis in the blood, faster erythrocyte sedimentation rate, general indisposition, sleepiness, bradycardia and, in 50 per cent of the cases, changes in the fundus oculi. The local (focal) symptoms may include epileptiform seizures, cerebellar disturbances, paralyses, and aphasias. Discovery of these symptoms in the presence of purulent foci in the organism should arouse suspicion of a cerebral abscess.

The treatment consists in surgical intervention with subsequent administration of penicillin and certain other antibiotics, as well as sulfonamides.

Cerebral Parasites

Cysticercosis and *echinococcosis* are the most common cerebral diseases caused by infestation with parasites. The cysticercus is the larval stage (the early stage of development) of the pork tapeworm. The disease results from penetration of the ova with contaminated food into the digestive tract. The larvae may gain entrance into the blood stream and settle in the brain. Multiple cerebral cysticercosis is usually observed.

Symptoms. The disease has numerous manifestations connected mainly with the number of parasites in the brain and their localization. Symptoms simulating those of cerebral tumours are most frequently observed. Remissions sometimes occur in the course of the disease. The disease is generally difficult to diagnose; in many cases cysticercosis exhibits no symptoms and is but accidentally discovered on autopsy. Discovery of excessive eosinophils in the blood plays a certain part in diagnosing the disease. Some cases are characterized by severe mental disturbances. The disease is often accompanied by convulsive seizures.

The treatment is symptomatic.

Cerebral echinococcosis occurs much more rarely than cysticercosis. The echinococcus lives in the intestines of dogs and wolves whose excrements containing the echinococcus ova may contaminate water, soil, etc. Gaining entrance into man's digestive tract the ova penetrate into the circulatory system by which they are transported to some internal organ (liver, lungs, brain).

The symptoms simulate those of tumours. The disease is difficult to diagnose. Surgical intervention is indicated.

Cerebral Traumas

Traumatic lesions in the brain are observed particularly frequently in wartime. All traumas of the brain are divided into closed and open traumas. Open traumas are accompanied by injury to the cranial bones and, as a rule, damage to the dura mater and the brain matter. Since patients with open traumas are for the most part kept under observation of surgeons, this chapter will deal only with the pathology of closed traumas—concussion and contusion of the brain.

Concussion of the Brain (commotio cerebri)

Symptoms. Concussion of the brain is characterized by loss of consciousness at the moment the injury is sustained. The person who has sustained the injury falls, his face turns pale,

the respiration and pulse slow, the blood pressure drops, the pupils are dilated and react to light either poorly or not at all. The tendon reflexes are absent. At the same time the patient may have a convulsive seizure and may vomit repeatedly. The severer the trauma, the more protracted and deeper the disturbance in consciousness. In some cases the trauma soon ends lethally. Unconsciousness lasts from several minutes to several hours, rarely longer. Then the patient gradually comes to, looks about without knowing where he is or what has happened to him, does not at once recognize the people he knows well and answers questions hesitantly, sometimes only after several repetitions of the questions. Subsequently the patient fully regains his consciousness. During this period another very important symptom of concussion of the brain comes to the fore—*retrograde amnesia,* i.e., loss of memory for events which have occurred before the trauma (see chapter on "Memory Disorders"). The first days following concussion of the brain are marked by headache, dizziness, sometimes nausea, and general weakness. The patients quickly tire even on slight effort, their mood is unstable and their sleep is light. The temperature may be elevated to 37.2-37.5°C. The patients experience difficulties in reading, since the latter intensifies the dizziness, and the words and lines merge. Moving the eyeballs is unpleasant and sometimes painful. Often the patient perspires generally or locally (hands, feet). In course of time all these disturbances gradually disappear. Mild cases of concussion are cured in 2-3 weeks; severe cases may last 3-5 months. The acute period of concussion of the brain is sometimes characterized by mental disturbances manifested in motor unrest, hallucinations and phobias; the patient rushes about, fails to recognize the people around him or mistakes his friends for enemies, etc. Such mental disturbances are called *traumatic delirium.*

Contusion of the Brain (contusio cerebri)

Symptoms. Many of the aforementioned symptoms are also observed in contusion of the brain. It is therefore sometimes difficult to draw a clear line between the two forms of injury. Contusion of the brain is always characterized by a graver condition because, in addition to concussion, there are also symptoms indicating injury to the brain as a result of crushing of cerebral substance and hemorrhages. In other words, in addition to general symptoms, contusion of the brain is always marked by focal disturbances. The injuries to cerebral substance result

from its striking against the cranial bones either at the site of the contusion or in the opposite part by the "counterthrust" mechanism (contusion of the frontal bones—focus of malacia in the occipital lobes). The condition is sometimes accompanied by subarachnoid hemorrhage. The presence of coarse focal lesions in the brain is often responsible for stable disorders of various functions and in some cases leads to development of so-called traumatic epilepsy. The impairments caused by contusion of the brain last much longer than they do in concussion of the brain, namely, months and sometimes even years.

Air-blast Injury

Air-blast injury (must not be confused with contusion) is often observed in explosions of shells, bombs, etc. In these cases the injury is caused by the air-blast which shakes the entire body of the victim.

The symptoms of air-blast injury very much resemble those of concussion of the brain. This injury is often marked by bleeding from the ears, nose and mouth. Air-blast injury is frequently followed by *deaf-mutism*. The onset of this reversible disorder is due to inhibition of the cerebral cortex, particularly its systems which are concerned with the functions of hearing and speech. The inhibition results from overstimulation of the auditory analyser nerve cells by an excessive acoustic stimulus.

Like concussion of the brain, air-blast injury sometimes gives rise to acute or prolonged mental disturbances.

Some persons who have survived a head trauma long retain a number of neuropsychic disorders manifested in frequent headache, dizziness, excessive irritability and lack of self-control. Diminished efficiency due to rapid tiring is observed. The patients cannot tolerate heat, stuffiness and noise. The vegetative disturbances are often manifested in tachycardia, excessive perspiration, rushes of blood to the head, sometimes cyanosis of the hands, etc. In the presence of signs of organic lesions in the central nervous system the foregoing symptom complex is designated as *traumatic encephalopathy*. The development of traumatic encephalopathy is favoured by additional harmful agents—infectious diseases, overstrain, repeated head trauma, inadequate treatment and failure to observe the necessary regimen immediately following the trauma; an important part is played by excessive use of alcohol.

Treatment. During the acute period of concussion of the brain and air-blast injury complete rest and ice bags to the head are indicated. To prevent penetration of vomit into the patient's

respiratory tract, the patient must be placed on a side. The heart's action and respiration must be carefully watched and, when necessary, the patient must be given injections of caffeine, adonilene, lobeline and cytitone (respiratory stimulant containing cytisine). To lower intracranial pressure in cases of protracted consciousness disorders, the patient must be given an intravenous infusion of 20-40 ml of a 40 per cent glucose solution, or be administered a magnesium sulfate enema after a cleansing enema; hypothiazide, novurit, urea and phonurit are prescribed.

In these cases a lumbar puncture is sometimes carefully made. In cases of motor excitement bromides, luminal or chloral hydrate, and hexenal (hexobarbital) are administered. Subsequently the patient must be strictly confined to bed (for 1-2 weeks in mild cases and up to 2 months in severe cases). A favourable effect during this period is produced by intravenous infusions of glucose solution with magnesium sulfate (a total of 15-20 infusions per course). As the treatment nears the end it is advisable gradually to engage the patient in work, and administer physiotherapy and exercise therapy.

In cases of open cranial injury first aid consists in arresting the hemorrhage and protecting the wound from infection. It is therefore necessary to apply a sterile dressing. To prevent shock, injections of caffeine, camphor and lobeline are made. It is necessary to administer antitetanic serum. The subsequent treatment of the wound and the brain is conducted in special neurosurgical hospitals. The patient must be transported only in a recumbent position by means of conveyance which exclude jolting—motor vehicle on asphalted highways, aircraft and water transport.

In cases of traumatic encephalophathy a good effect is produced by a course of intravenous infusions of a 40 per cent glucose solution (10-15 ml) and a 25 per cent magnesium sulfate solution (2-4 ml). The infusions are administered every other day, 15-20 infusions for the course. Signs of elevated intracranial pressure indicate a lumbar puncture—5-10 ml of cerebrospinal fluid are extracted. Bromides (3-6 per cent sodium bromide, a tablespoonful 2-3 times a day) are recommended to regulate the patient's sleep. It is desirable that such patients should be temporarily exempted from work in hot and noisy places. A course of warm baths produces a favourable effect. Alcoholic liquor is absolutely prohibited.

Diseases of the Vegetative Nervous System

The vegetative nervous system is anatomically and functionally most closely connected with man's entire nervous system. Any diseases of the nervous system are therefore in some measure manifested in dysfunction of the vegetative nervous system. For example, cardiac and respiratory disturbances are observed in cerebral trauma. In certain cases signs of disturbances in the vegetative nervous system are so clearly marked in the picture of the disease that clinicians distinguish them as disease entities. We shall discuss only the most important disturbances connected with the vegetative nervous system.

Migraine (hemicrania)

Symptoms. This disease is characterized by periodic attacks of intense headaches, most commonly in one half of the head. As a rule, the attacks arise without any apparent reason and last up to several hours. The headaches are often accompanied by nausea and vomiting. The patient turns pale and less frequently red in the face. During attacks any external stimuli (bright light, noise, etc.) intensify the headache. The attacks usually terminate after sleep. During the attacks the patients sometimes see stars before their eyes and their vision is impaired. It has long been observed that migrainous pains often affect several members of the same family.

The causes and mechanism of development of migraine are unknown. According to some points of view, the attacks of migraine are based on a spasm or, on the contrary, a dilatation of the vessels in the brain and its meninges.

Treatment. To alleviate the headaches, preparations acting on the cerebral vessels—caffeine, theobromine—and cold or hot applications to the head are prescribed. The patients are advised to observe an appropriate regimen in work, rest and sleep. Strong coffee, alcoholic liquor and smoking must be prohibited. The diet must not contain too much meat. The intestinal function must be carefully watched.

Angioneurotic Edema (Quincke's disease)

Symptoms. This condition is characterized by a sudden appearance of edema on a limited portion of the skin of the face or the mucous membranes (for example, the region of the lower eyelid or the skin about the eye). Less frequently the edema

involves the whole face or extremity. Its borders are not clearly defined. The edematous part of the skin is pale or slightly yellowish. Palpation reveals its elastic consistency. Pressure with a finger leaves no trace (the colouring does not change and no indentation remains). There is usually no pain at the site of edema, but sometimes this part itches and seems to contract. The affection lasts several hours and disappears without leaving a trace. Sometimes Quincke's disease develops on the mucosa of certain internal organs (larynx, stomach, esophagus), which leads to disturbances in the functions of the corresponding organ; especially dangerous is the edema involving the laryngeal mucosa which may cause suffocation. The attacks of the disease occur at different intervals.

Persons affected with this disease are often predisposed to urticaria which is also observed without attacks of angioneurotic edema. Urticaria is a skin condition characterized by the appearance of small, intensely itching and burning wheals which sometimes merge, on the skin of the trunk (chest and back). It arises without any apparent reasons.

It is believed that the onset of urticaria is favoured by such factors as impaired gastrointestinal function, emotional stress, helminth infestation, and dietary indiscretions.

Treatment. During the acute period a good effect is produced by intravenous infusion of calcium chloride (5 ml of a 10 per cent solution) and magnesium sulfate; the patients are also given dimedrol (diphenhydramine).

To relieve the itching, rubbing down the skin with aromatic vinegar, mentholated alcohol, and a 5 per cent anesthesin (ethyl aminobenzoate) ointment is recommended.

PSYCHIATRY

GENERAL INFORMATION

GENERAL DESCRIPTION OF MENTAL PROCESSES AND THEIR PHYSIOLOGIC BASIS

The methodological basis of Soviet psychology and psychiatry is the Marxist-Leninist philosophy. On the basis of the principal laws of dialectical materialism thinking must be considered a property of the brain. "Sensation, thought, consciousness are the supreme product of matter organized in a particular way."* It follows that the brain is the material organ of thinking.

Contrary to this materialist point of view, idealist philosophers believe in the existence of a soul. In their opinion it is independent of the environment and man's organism, but governs man's thoughts, feelings and will.

The idealist interpretation of the essence of the mind is fundamentally wrong and contradicts man's experience and all of his accumulated knowledge. To get a correct insight into the essence of mental disturbances, it is necessary to have at least general knowledge of the basic mental processes in their normal manifestation.

All mental processes may be conditionally divided into the following three basic groups, although they are inseparably interconnected and represent various aspects of man's indivisible mental activity: (1) intellectual processes conditioning man's cognitive activity, (2) emotional processes underlying man's attitude to the surrounding phenomena, and (3) volitional processes determining man's volitional acts.

Man's cognitive activity begins with *sensation* as a result of which various properties of the surrounding phenomena and objects are reflected in the brain. Man senses sounds, colours, odours, etc. The sensations are perceived by the sense organs—of hearing, vision, smell, etc.

The next stage in man's cognitive activity is *perception* which reflects not only the various aspects (qualities) of objects and phenomena, but also the aggregate of their various qualities, i.e., the integral images of these objects. For example, the perception of a tree is made up of the aggregate of sensation of

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* V.I. Lenin, *Works*, 4th Russ. ed., Vol. 14, Moscow, 1954, p. 43.

size, colour, form, etc. Traces of perceptions are consolidated and retained in the brain. Such traces of previously perceived objects and phenomena are called *concepts*. A concept is the image of a thing or phenomenon in the mind. The greater his experience, the more concepts man has. Man's ability to retain traces of past perceptions and sensations and to reproduce them as concepts (images, objects) and ideas is called *memory*.

Thinking is the highest form of man's cognitive activity. The processes of thinking make it possible to generalize, analyse and compare what is reflected in the perceptions and concepts. Thinking results in formation of conceptions, judgements and conclusions. Thinking is inseparably linked with speech.

The following may serve as an example. Man looks at a picture. To begin with, he perceives various colours and forms (red, green, white, round, oval, etc.) which build up into definite objects and images. By comparing his perceptions—lines of people dressed in sports clothes, the flags, band, etc.—with the reserve of concepts furnished by his previous experience he arrives at the conclusion that it is a picture of a sports parade. A conclusion can be drawn only by thinking.

Thus, thinking is generalization and most complete and precise reflection of reality.

The emotions which express man's attitude to the surrounding phenomena are the next aspect of the indivisible mental process. For example, while examining the picture, man experiences certain emotions, i.e., manifests his attitude to what he is perceiving. These emotions may be pleasure, joy, etc. A poorly made picture may evoke a sense of vexation and displeasure.

However, man does not merely perceive his surroundings with a certain emotional attitude. He manifests desires and strivings to make certain changes in them, which are expressed in his acts and deeds. All these manifestations are known as *volitional processes*. The volitional processes include active attention. It may thus be said that cognitive activity is impossible without volitional processes.

How do all these most complex processes operate? What underlies these processes? These questions have long occupied the minds of philosophers and naturalists.

A. Herzen, V. Belinsky, N. Chernyshevsky and other Russian revolutionary democrats of the 19th century attacked the problem of the essence of the mind from materialist positions and regarded thinking as a product of cerebral activity. This point of view found its natural-science confirmation in Sechenov's and Pavlov's remarkable physiologic studies. Proper com-

prehension and investigation of the mental processes is impossible without knowledge of the principal propositions of Sechenov's and Pavlov's materialist teachings.

Numerous different stimuli are continuously transmitted to the human brain through the receptors. These stimuli include various sounds, colours, sense of heat and cold, sensations from the internal organs, etc., and are all perceived, according to Pavlov, by the *first signal system*. Any of these stimuli may, under certain conditions, become conditioned stimuli and evoke a particular conditioned reflex. Pavlov thus regarded conditioned reflex activity as signalling activity. Both man and animals have the first signal system, but the animals' perceptions of the environment are limited to, and their lifelong behaviour is determined by the signals of the first system.

In man, on the basis of the first signal system of reality and inseparably from it "second degree signals, i.e., signals of these primary signals, in the form of words uttered, heard and seen, have appeared, developed and become extraordinarily perfected."* Pavlov ascribed man's ability to associate with his kind by means of speech and writing, as well as his ability to think, to the activity of the *second signal system*.

The basic nervous processes—excitation and inhibition—may vary in strength, mobility and balance. On the basis of these qualities of the nervous processes Pavlov distinguished

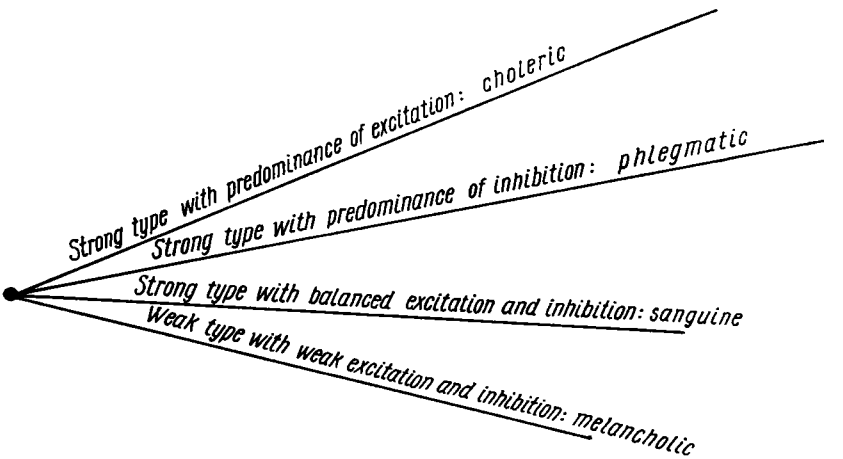
Strong type with predominance of excitation: choleric
Strong type with predominance of inhibition: phlegmatic
Strong type with balanced excitation and inhibition: sanguine
Weak type with weak excitation and inhibition: melancholic

Fig. 38. Diagram of types of higher nervous activity

* I.P. Pavlov, *Complete Works*, 2nd Russ. ed., Vol. 3, Book 2, Moscow and Leningrad, 1951, p. 345.

four basic types of higher nervous activity. He compared these types of nervous system with the four temperaments described by Hippocrates, namely, choleric, phlegmatic, sanguine and melancholic. He also distinguished three strong types and one weak type of nervous system and characterized them as follows: (1) strong type with predominance of processes of excitation (choleric); (2) strong type with predominance of processes of inhibition (phlegmatic); (3) strong type with balanced processes of excitation and inhibition (sanguinic), and (4) weak type with weak processes of excitation and inhibition (melancholic). Fig. 38 shows a diagram of types of higher nervous activity.

In virtue of man's possession of the second signal system Pavlov distinguished three main types of higher nervous activity inherent only in man, basing them on the relations between the first and second signal systems. These are: (1) artistic type with predominance of the first signal system, (2) intellectual type with predominance of the second signal system, and (3) intermediate type with both signal systems balanced. People of the artistic type perceive reality vividly, imaginatively, and feel confident in their surroundings. People of the intellectual type are not infrequently inclined to ratiocination and doubt, and are indecisive.

As was already mentioned, nervous activity is based on the processes of excitation and inhibition. These processes continuously alternate, usually rapidly. In pathology they do not alternate for a long time in which case they are said to have *inert* foci.

The transition from excitation to inhibition takes place through certain intermediate states of activity of the nerve cells known as *phasic states* (*hypnotic phases*). Usually nerve cells react to strong stimuli more strongly than they do to weak stimuli; in phasic states the reaction of the nerve cells is altered. The following phases are distinguished according to the reactions of the nerve cells to particular stimuli: *equalizing phase* characterized by equally strong reactions to both strong and weak stimuli; *paradoxical phase* characterized by stronger reactions to weak stimuli than to strong stimuli; *ultraparadoxical phase* characterized by absence of reaction to both strong and weak stimuli, with reaction to inhibitory stimuli, i.e., stimuli which before the onset of this phase evoked inhibitory reactions in the cells. For example, a differentiation is elaborated in the dog. Metronome sounds with a frequency of 100 beats per minute are reinforced by food, while those of 150 beats are not. After a number of repetitions of the former combination the

dog develops a conditioned reflex. As soon as the metronome with 100 beats is brought into play the dog begins to salivate without being given food. The metronome with 150 beats evokes no salivation. Suppose inhibition develops in certain cortical cells. The metronome with 150 beats which acted as an inhibitory stimulus will evoke salivation during the ultraparadoxical phase whereas that with 100 beats will not; *narcotic phase* is a gradual extinction of conditioned reflexes in response first to weak, then to medium and, lastly, to strong conditioned stimuli; in cases of total inhibition the cells cease to react to any stimuli. Hypnotic phases in sound people can be observed while falling asleep, on awakening or during light sleep. This partial inhibition is found in certain mental diseases; it may long persist even in a vigilant state.

Pavlov distinguished three forms of inhibition—external, internal and protective (transmarginal). The following phenomenon may serve as an example of *external inhibition*. If two foci of excitation arise in the cerebral cortex the weaker of the two is inhibited in virtue of the law of negative induction.

Internal inhibition is inherent only in the cerebral cortex. It forms in the same manner as temporary conditioned connections and underlies conditioned inhibitory reflexes. Pavlov distinguished several forms of internal inhibition—extinctive, conditioned, delayed and differentiating. Internal inhibition is very important for man's behaviour. Diminution in internal inhibition leads to a number of disturbances. Sleep is based on internal inhibition spread over the entire cerebral cortex.

Protective Inhibition. The strength of a response reaction of a nerve cell depends on the strength of the stimulus, but it does not increase indefinitely. The limit depends on the endurance of the nerve cell. The moment may arrive when the cell can no longer cope with the work required of it. In such cases transmarginal (protective) inhibition will develop in the cell in response to the subsequent stimuli. It is called protective because it protects the cell from destruction.

The nerve cells restore their energy reserves only when they are in a state of inhibition. On the basis of this fact Pavlov theoretically substantiated the importance of therapeutic sleep.

SYMPTOMS OF MENTAL DISEASES

Disorders of Perception

The disorders of perception in mental patients manifest themselves as illusions and hallucinations.

Illusions

Illusions are distorted perceptions of actually existing objects. They are classified according to the sense organs as optical, acoustic, olfactory, tactile and gustatory. The following phenomena may serve as examples of optical illusions: a robe hanging in the room may be taken for a person, a bush in the forest —for a beast. Perception of the sound of falling drops as words or sentences is an example of an acoustic illusion.

Illusions are sometimes observed in mentally sound people, especially in cases where the surroundings are not clearly perceived (semidarkness, noisy room) or the person labours under emotional stress (apprehension, fear and particularly so when both these sensations are combined).

Illusions (mainly optical and acoustic) not infrequently arise in cases of infectious diseases, poisoning and severe emaciation.

There are also so-called physical illusions. For example, a spoon immersed in a glassful of water appears broken. The reason is that the rays of light have different angles of refraction in different media (air and water).

Pathologic Physiology of Illusions. It has been established that illusions arise when incongruous concepts are added to perceptions. For example, if a concept, not of a robe, but of a person is added to the perception of a hanging robe, the robe will be perceived as a person. Conducive to this is the fact that at the given moment, in virtue of certain circumstances, there is a vivid concept of a person.

Hallucinations

Hallucinations are imaginary perceptions or perceptions without an external stimulus.

Whereas in illusions the really existing objects are perceived distortedly, in hallucinations the person sees something, hears something, etc., although there is no real or, to be exact, adequate stimulus.

The dreams of healthy people resemble hallucinations. Hallucinations very rarely occur in healthy people during waking.

Like the illusions, hallucinations are classified according to the sense organs. The most common hallucinations are visual, auditory and olfactory. The form of hallucination depends on the character of the disease.

For example, *visual hallucinations* (Fig. 39) are most commonly observed in cases of acute intoxication psychoses (for example, in delirium tremens) and infectious diseases; the patient may see people, animals, various monsters. The hallu-

cinatory images may be stationary, but may also move, may be vivid or vague. Sometimes the patient himself actively participates in the scenes staged in his hallucinations (the patient flees from pursuers, tries to catch something, etc.).

Auditory hallucinations occur particularly frequently in the schizophrenic reaction and in alcoholic hallucinosis (Fig. 40). The patient hears sounds or human voices; the voices may be familiar or strange, and some patients hear them on different sides and at different distances. The content of the hallucinations varies—the patient may be peacefully conversing with voices, or the voices may denounce him or issue such orders as "don't eat!" or "don't answer any questions!" Often patients think they are being hailed, being called by name.

Like auditory hallucinations, *olfactory hallucinations* most frequently occur in the schizophrenic reaction. The patients smell odours, as a rule, of an unpleasant character—musty, fetid, and of poison gases.

The patients hold their noses, stuff them with cotton, etc. (Fig. 41).

The patient's behaviour at the time of hallucinations largely depends on his own attitude which may be *critical* or *uncritical*.

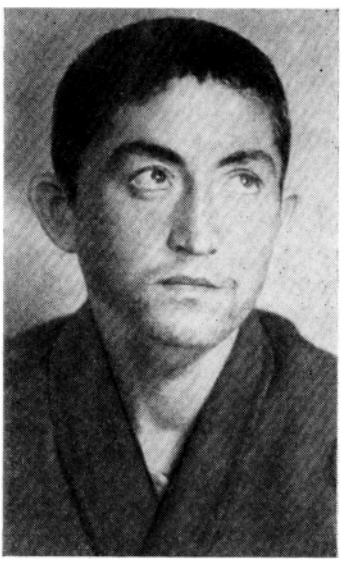

Fig. 39. Fixed stare of patient with visual hallucinations

Fig. 40. Patient with auditory hallucinations

It is considered critical when the patient regards his hallucinations as a pathologic manifestation. Sometimes such patients continue to work and carefully hide their hallucinations from their associates. The patient's attitude is considered uncritical when the hallucinatory voices or images are regarded as actually existing. In such cases the patient's behaviour is often determined by the content of the hallucinations. For example, one female patient was commanded by voices to throw boiling water on herself, which she did and severely scalded her legs. Another patient who was travelling by train was ordered by voices to destroy his railway ticket. The patient did it three times, each time buying a new ticket at the nearest railway station. Upon arrival at his destination he was ordered by the voices to give his valise to one of the passers-by, which he attempted to do.

All the aforedescribed hallucinations are called true hallucinations. When the hallucinatory voices or images are not projected to the exterior, but are localized within the head and the patient feels that he is perceiving them, not through the sense organs, but mentally, these hallucinations are referred to as *pseudohallucinations*. For example, one patient periodically heard in his head a voice which said "devil" and simultaneously saw in his head this word written in grey letters. In such cases the patients usually say that they hear with their "mind's ear" or see with their "mind's eye".

So-called bodily hallucinations are also observed; in these cases the patients experience various unpleasant sensations in the body—electric current passing through the body, "bubbles bursting in the intestines", special pressure, etc. Such halluci-

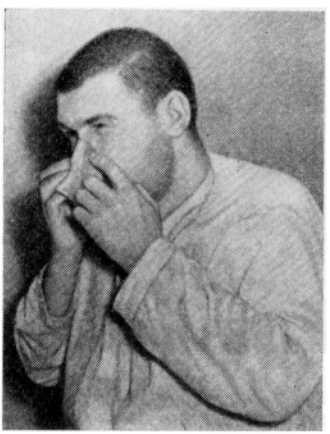

Fig. 41. Patient with olfactory hallucinations

nations are particularly frequently observed in the schizophrenic reaction and in encephalitis.

Pathologic Physiology of Hallucinations. Scientists have long been studying the mechanisms of hallucinations. A good deal has been accomplished in this respect by V. Kandinsky, Russian psychiatrist of the 19th century.

There are several theories of hallucinations. We shall discuss two of them. According to one theory, hallucinations arise as a result of appearance of pathologic foci of inert excitation in the central (cortical) end of a particular analyser. For example, in visual hallucinations such a focus of excitation is located in the occipital lobe of the brain.

The investigations conducted by Y. Popov and his associates have shown that hallucinations are based not on the process of excitation, but on the process of partial inhibition in the cerebral cortex. In other words, according to this conception, hallucinations arise at a time when there are transitional (hypnotic) phases in the cerebral cortex (see p. 108).

The connection between the onset of hallucinations and incomplete inhibition of the cortex is also demonstrated by the effect of certain pharmacological agents. For example, if the patient is given caffeine which intensifies the processes of excitation the hallucinations diminish. On the other hand, if the patient is given bromides which intensify the processes of inhibition, the hallucinations may increase. The inhibitory theory of hallucinations is also supported by the fact that the hallucinations increase under conditions favouring development of inhibition (evening hours, quiet).

Memory Disorders

Memory is the ability to perceive, retain what has been perceived and reproduce it. In practice it is most commonly the ability to reproduce past experience that is affected.

Everything that is perceived by man leaves some trace in the brain. The brain of a human adult contains innumerable traces of past perceptions. Not all traces can be reproduced, however. Some events are recalled with ease, others—with great difficulty, and still others cannot be recalled at all. Why? This question can be answered in a definite manner.

It has been established by a number of investigators that memory is based on associations, i.e., conditioned bonds. The strength of these associations depends on the remoteness and strength of the perceptions, the frequency of repetitions, the emotional attitude to what was perceived, and the number of

concepts (already existing in the brain or arising at the time of the perception) with which the particular perception will be connected (associative bond). It follows that, if the perception can be linked with past experience, it will be easier to recall than when it has no such connection.

Memory disturbances are divided into disorders of memorization and recall. A person suffering from memorization disorders loses the ability to commit new material to memory. In such cases he may read a page many times and yet be unable to reproduce its content.

There are cases where upon each repeated reading the text of the same page is perceived as something new. Such states are most commonly observed in Korsakov's psychosis and certain other diseases (senile psychosis, arteriosclerosis, infectious diseases, traumas).

Memory disturbances include *hypomnesia*—weakened memory. This is a condition in which man recalls with great difficulty what he once knew very well, or is unable to recall some events at all.

For example, a patient, engineer, was able to name only two of Pushkin's poems ("Yevgeny Onegin" and "Gypsies") and could not recall any more. When asked the number of his grandchildren he said he had four, but could name only two, although he had lived with all of them for a number of years.

Amnesias. Amnesia implies the loss of memory for events of a certain period of time. Depending on the period for which the memory is lost two forms of amnesia are distinguished: *retrograde amnesia* (loss of memory for the events occurring before the onset of the current disease) and *anterograde amnesia* (loss of memory for the period immediately following the onset of the disease; in this case the patient is unable to remember the current events). Memory disorders of the type of retrograde amnesia are observed in cases of concussion of the brain. Upon return of consciousness the patients cannot recall how the accident occurred nor what they did that day.

Sometimes memory disturbances may be accompanied by *false recollections.* The patients transfer past events to the present. For example, asked what she did a few hours ago a patient who had taught secondary school many years previously said she had just had a conference with the principal of the school and had taught her class (1947).

Patients suffering from memory disorders sometimes confabulate. For example, a patient who had been in the hospital for about 3 months said he had 2 days since returned from a trip abroad. Such memory disturbances most commonly occur

in cases of organic lesions in the brain (arteriosclerosis, general paresis, cerebral syphilis, etc.).

Pathologic Physiology of Memory Disorders. Memory disorders are due to inhibition of previously formed conditioned bonds. In some cases (upon improvement of their mental health) patients recall facts which they were unable to recall during their illness. In organic diseases the memory is lost in virtue of the destruction of cerebral nerve cells.

Disturbances in Thinking

The disturbances in thinking observed in the mental clinic vary very widely. They may manifest themselves in so-called *accelerated thinking*, the patients thinking so fast that they cannot give expression to their thoughts. Such patients are difficult to understand because they often omit words and even phrases.

This state is most commonly observed in the manic phase of the manic-depressive reaction. *Decelerated thinking* is observed in the same disease, but in the depressive phase. In these cases some single idea long persists in the patient's mind. Such patients answer in monosyllables, slowly and with long pauses between the words.

Both accelerated and decelerated thinking are connected with the greater or lesser ease with which ideas arise; the ideas are in their turn closely connected with the associative activity of the brain.

Adhesive thinking implies a pathologic thoroughness. When a patient is asked to describe some happening he long dwells on details of secondary importance and very slowly comes to the main point. Such patients are usually very difficult to listen to. Pathologic thoroughness is often observed in epilepsy and may be due to inertness (immobility) of the nervous processes of excitation and inhibition which is characteristic of this disease.

Philosophizing is an inclinaton for unnecessary reasoning, mere sophistry. The subject of philosophizing is usually something undeserving of attention.

In cases of a *disturbed stream of thought* the individual sentences are properly constructed grammatically but are not connected with each other. It is sometimes absolutely impossible to understand such patients. For example, asked how he feels, the patient answers: "No point, cabbage squabble, what has Smith to do with it, and you told mummy."

Philosophizing and a disturbed stream of thought are often observed in the schizophrenic reaction.

Obsessive Compulsive Reactions

This term unites various pathologic reactions which may manifest themselves as obsessive reminiscences, fears, doubts, desires and actions.

As distinct from delusions (see chapter on Delusions) the patients are almost invariably critical of their obsessive compulsive reactions. They are usually aware of the absurdity of their thoughts, movements and fears, and fight them, but cannot control them.

Obsessive compulsive reactions are also observed in mentally sound people. Everybody knows how persistently some melody may linger on, much as one may want to forget it. In healthy people these states never last more than a few hours or days, but in mental patients they may persist for months and even years.

Obsessive Fears (Phobias). In some patients this obsession is manifested as fear of contracting some infectious disease, in others—as fear of confined spaces or fear of crossing streets. For example, a certain patient for many years was afraid of contracting rabies. He was continuously obsessed with the idea, which he was unable to control, that some mad dog or rat would unnoticeably bite him in the street. He was well aware that that could not possibly happen, but was nevertheless unable to fight off his fear. He carefully concealed his obsession from his associates.

Obsessive Doubts. The patients are continuously tormented by doubts. For example, on his way home from work the patient doubts that he has put away important papers as he should and sometimes makes several trips back to work to make sure; upon leaving home he doubts that he has locked the door, turned off the lights, etc.

Obsessive Desires. These may vary very widely. The patients may want to jump out of an upper floor window, touch a speeding motor vehicle, etc.

One patient wanted to throw her child out of the window. This obsession frightened her, she moved away from her window and asked that it be boarded up.

Another patient, 60 years old and very religious, was obsessed with a desire to utter sacrilegious words every time she neared a church. She was uncommonly distressed by it, but could not control this desire.

Obsessive Compulsive Acts. The patient performs compulsive acts—counts house windows, telegraph posts, adds the license numbers of passing motor vehicles, etc. Sometimes the compulsive acts manifest themselves in frequent coughing, screwing up the eyes, washing the hands, etc.

Pathologic Physiology of Obsessive Compulsive Reactions. Like the delusions, these reactions are most commonly based on an inert focus of excitation or the ultraparadoxical phase.

In obsessive compulsive reactions, unlike the delusions, the inert focus is weaker and the inductive inhibition around this focus is, consequently, less strongly pronounced. If the patient engages in work which interests him, obsessive compulsive phenomena may diminish. In such cases new foci of excitation apparently arise in the cerebral cortex, inhibition spreads around these foci and the inert focus weakens. Persons with obsessive compulsive reactions are not advised to give up work.

In the obsessive compulsive reactions the ultraparadoxical phase probably affects a relatively small part of the cortex while the other parts of it function normally, for which reason the patient has a critical attitude to the obsessive desires and never carries them into effect, especially if carrying them into effect involves violation of the law.

Delusions

A delusion is a belief which rests on a morbid basis, is at variance with reality and is not subject to criticism and correction. Any mentally healthy person may have a false belief, but he can be dissuaded. Should a person develop a delusion, however, he cannot be dissuaded regardless of all incontrovertible evidence contrary to his belief.

A delusion is an incontestable sign of a mental disease. Various diseases may be accompanied predominantly by definite forms of delusion.

Delusion of Reference. The patient maintains that a number of surrounding phenomena and objects bear a direct relation to him. When anybody talks or smiles, the patient believes that it is he who is being talked about and laughed at. He has a feeling that the fork lying on the table has something to do with him, that it constitutes some sort of a hint, etc.

Delusion of Persecution. Patients with this form of delusion maintain that they are being watched by representatives of an "espionage" organization, who peep into windows, follow them about in the streets, etc. (Fig. 42). While travelling such peo-

ple may repeatedly change the means of conveyance; to escape their "enemies" they move to other towns.

Delusion of Poisoning. The patients believe that some people want to poison them, that those people are poisoning their food. They sometimes refuse to eat. One patient was sure his neighbours living on the floor below were forcing gas through the floor into his room and decided to flood the room in order to prevent the penetration of the gas. The water trickled down and spoiled the plaster. When his condition was understood he was sent to a mental clinic.

Delusion of Physical Influence. The patients maintain that they are being acted upon by rays emitted by some special machines and radio, and that these rays affect their health or influence their movements and acts. For example, a patient believed that his neighbour damaged the "valves of his esophagus" "by tapping" and that he therefore ejected intestinal gases through the mouth.

Hypochondriacal Delusion. The patients believe themselves suffering from some disease (Fig. 43). Their complaints vary very widely. Some maintain that their stomach is rotting away, others—that a bone has stuck in their intestines and has pierced the spine, still others—that their heart has long ceased functioning and that they will soon die. These forms of delusion are characteristic of the schizophrenic reaction.

Delusion of Grandeur and Wealth. The patients believe them-

Fig. 42. Strained stare of patient with delusion of persecution

selves to be great generals or scientists, inventors or wealthy persons having a lot of money, carloads of gold. One patient maintained he had a private plane in which he flew every morning to the North Pole for pleasure. This form of delusion characterized by extreme incongruity is particularly frequently observed in patients suffering from dementia, for example, those affected with general paresis.

Fig. 43. Hypochondriac continuously wearing a "brain bandage"

Delusion of Damage. This form of delusion is typical of patients with senile psychosis. These patients are convinced they are being robbed and for this reason usually hide their personal effects; since their memory is, as a rule, impaired and they forget where they have hidden their things, their delusion is reinforced. While in the hospital such patients sometimes roll up their bedding and try to hide it from imaginary thieves and robbers.

Delusion of Guilt. The patients believe themselves to be criminals and maintain that their actions have caused irreparable damage to the state, family, etc. They declare that they must be severely punished, harbour suicidal thoughts and sometimes attempt suicide. This form of delusion is characteristic of presenile psychoses.

There are various other forms of delusion, but the ones described above are the most common. It should be remembered that the selfsame form of delusion has individual characteristics in each patient. For example, a patient who was an engineer maintained that he had invented an instrument for locating uranium ore deposits and would soon win country-wide renown. Another patient stated that he had originated a method of reviving the dead with cabbage juice, i.e., it was the case of absurd inventionalism.

Pathologic Physiology of Delusions. According to Pavlov, delusion is most commonly produced by two pathophysiologic

mechanisms—inert focus of excitation or the ultraparadoxical phase, as is the case in absessive states. In obsessive compulsive reactions, however, the aforementioned pathologic disturbances are less strongly pronounced.

From the pathophysiologic point of view the appearance of a delusion is associated with a pathologic focus of excitation in the brain. In the event of a strong and inert focus stable inhibition will develop around it according to the law of negative induction. This inhibition may be so strong as to sever the connections between the focus of excitation and the rest of the cortex. That is why in cases of delusion criticism is always absent, i.e., in evaluating his delusion the patient cannot utilize his experience and the facts at his disposal.

Only certain forms of delusion are connected with the ultraparadoxical phase. These include, for example, the delusion of guilt. Thus, whereas any idea of violating the law was inhibited in the person before, during the ultraparadoxical phase the patient begins to consider himself a criminal.

Dementia

Dementia is a disturbance in thinking, as a result of which the person's ability to understand the relationships of the surrounding phenomena is diminished, the person cannot distinguish the most important things from those of secondary importance and becomes uncritical of his statements and behaviour. The condition involves a loss of memory and diminution in the stock of knowledge and ideas.

The patients are incapable of abstraction and generalization. In other words, the condition is characterized by a marked deterioration of intellect. Two forms of dementia are distinguished—congenital and acquired.

Congenital dementia or oligophrenia is characterized by underdevelopment of the brain as a result of intrauterine injuries or diseases in early childhood.

Acquired dementia is most commonly the result of organic affection of the brain at a later age and is brought about by such diseases as general paresis, senile psychoses, cerebral arteriosclerosis, etc. (Fig. 44).

There was a case when a demented patient set a house on fire in order to drive mosquitoes out of his room. Another patient tried to patch up the rusty roof of his house with a newspaper. Such behaviour of patients attests that they have lost the ability to see the interrelations of the surrounding phenomena. Asked the main difference between a steamship and

train one such patient said that the steamship had a somewhat wider smokestack. Another patient thought that tramcars differed from trolleybuses mainly in that the former were mostly red and the latter blue. The dementia that sometimes develops in the schizophrenic reaction has its own distinctive characteristics. In a number of cases such patients may be able to solve complex problems and yet be absolutely unadjusted to life.

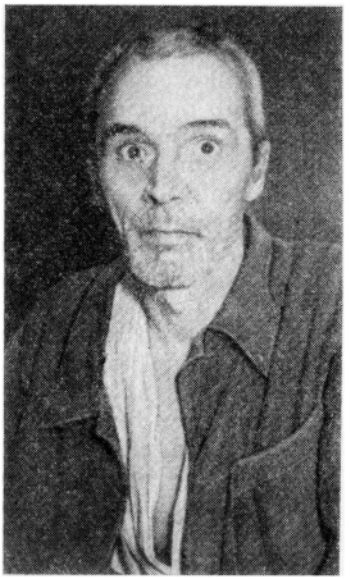

Fig. 44. Countenance of patient with acquired dementia

Pathologic Physiology of Dementia. Dementia is most commonly based on a coarse organic lesion in the brain (destruction of nerve cells) which leads to severe disorders of higher nervous activity. Formation of new conditioned reflexes is rendered absolutely impossible. The complex systems of conditioned reflexes formed earlier in the process of individual development begin to be destroyed. In cases of schizophrenic dementia these systems of conditioned reflexes apparently become inactive and only under certain conditions may begin to function normally.

Emotional Disturbances

Emotions—joy, sorrow, rage, love, etc.—play an important part in the life of man. Normally all mental processes are accompanied by certain emotions. Fatigue sets in at different periods depending on the emotional attitude to the work being done. If the work is interesting, fatigue may long be delayed.

The human organism is continuously acted upon by numerous and various stimuli, both external and internal. The feelings arising in a person depend on the character of the stimuli and the condition of the organism, the sum total of the feelings determining the person's mood. In the course of the day the mood of every healthy person may vary within certain limits.

A violent manifestation of emotion (rage, joy, fear or grief) is called an affect.

When an affect is accompanied by a clouding of conscious-

ness it is known as a pathologic affect. In such a state man may commit a heinous crime. The termination of this state is often followed by sleep and, on waking, complete amnesia of the events occurring during the pathologic affect.

The emotional states are judged by the patient's movements, gestures and statements, by the changes taking place in metabolism, and the vegetative reactions. It is well known that in certain emotions the amount of sugar in the blood changes, the viscosity of the blood alters, the vessels in the brain, heart, lungs and kidneys dilate. All these phenomena are not accidental and are of considerable biological importance. For example, in excitement and fear the amount of sugar in the blood increases and, as is well known, the nutrition of muscles depends on the amount of sugar in the blood.

It has now been established that the reflex arc of emotions in the main closes in the subcortex. Observations show that emotions are the most strongly pronounced in cases of subcortical predominance, for example, in children. In cases of an affected cortex and weakened cortical processes in a human adult, the manifestation of emotions is not usually intensified.

It should be remembered that the primitive emotions which exist since birth are connected with the subcortex. In the course of life more complex emotions arise on their basis with the participation of the cortex. That is why the cortex and subcortex are said to participate in the manifestation of emotions.

Various mental diseases may involve an increase or decrease in emotionality.

Increased emotionality includes such states as euphoria, depression, anxiety and fear, decreased emotionality—emotional hypesthesia and indifference.

Euphoria is an exaggerated sense of well-being. Persons in a state of euphoria are in high spirits and see everything as though through rose-coloured glasses; they laugh a great deal and are content with everything. This state is often observed in cases of organic affections of the brain, for example, in general paresis. In the manic-depressive reaction euphoria is, as a rule, combined with an urge for activity.

Depression is a state opposite to euphoria. The patients move about slowly; they are melancholic, see the dark side of everything and often feel there is no sense in living. This state is characteristic of the depressive phase of the manic-depressive reaction.

Anxiety. The patients are anxiously apprehensive. Usually their anxiety is ungrounded. Sometimes they expect something dreadful to happen to themselves or their relatives. As in depres-

sion they often harbour suicidal thoughts. The state of anxiety is most commonly observed in patients with presenile psychoses.

Fear. Fear is not infrequently the leading factor of depression or anxiety. Sometimes the patients fear something definite, but in other cases they may be possessed of unaccountable fear. Under the effect of fear some patients seem to freeze in a certain pose, others try to take to flight.

Emotional Hypesthesia. With a slight decrease in emotionality the patients are more indifferent to their surroundings and treat their associates and relatives more coldly than before. In extreme cases this state is referred to as emotional hypesthesia. The patients become apathetic and indifferent. For example, if asked whether he would like to be discharged the patient says that it makes no difference to him where he is, in the hospital or at home. Such patients usually have no plans for the future. They may receive the news of the death of a close relative with total indifference. This state is most commonly observed in the schizophrenic reaction.

In the same disease external stimuli sometimes evoke incongruous and inadequate emotional manifestations. For example, the patient may smile when informed of the illness of a close relative.

Pathologic Physiology of Emotional Disorders. An increase in emotionality is usually associated with excitation of the subcortex. V. Protopopov's works show that in manic-depressive states there is an inert focus of excitation in the subcortex. Diminution in emotionality is due to a decrease in the tone of the subcortex and cortex. In cases where the interaction between the cortex and subcortex is disturbed man's feelings do not conform to his external emotional reactions (laughter in response to sad news).

Weakening of the cortical processes facilitates the manifestation of emotions. In these cases patients may easily cry or laugh on the slightest provocation and readily change from crying to laughter and vice versa. They are often critical of these manifestations, but cannot control them. This emotional disturbance is known as *emotional instability.*

Disorders of Volitional Activity

Man's conscious and purposeful acts are associated with his volitional functions. Various mental diseases may be marked by different disturbances in these functions. These disturbances may be divided into two large groups—increase and diminution in volitional activity.

For example, in a manic state the increase in volitional activity is manifested mainly in overtalkativeness and motor excitement, both the speech and movements of the patients being of a purposeful character.

The depressive phase of the manic-depressive reaction is always characterized by a diminution in volitional activity. The patients spend hours on end in one pose, take no interest in anything and, when talked to, speak slowly and in monosyllabic phrases.

Overtalkativeness and motor excitement are also observed in a number of cases of the schizophrenic reaction, but speech is often inarticulate and the movements are purposeless.

A decrease in volitional activity may be noted in a number of organic affections of the brain (general paresis, cerebral tumours, cerebral arteriosclerosis, etc.).

A marked disturbance in active attention, which is also one of the volitional functions, is often observed in neurasthenia. It is attention that enables man to direct his activities. Two forms of attention—active and passive—are distinguished. Passive attention consists in man's ability to react to the surrounding stimuli without any volitional effort. These stimuli leave a certain trace in the cerebral cortex. For example, a person walking in the street makes no special point of observing anything. In this case his account of what he saw will characterize his passive attention.

Active attention is always associated with a volitional effort. For example, a person wishing to do something requires active attention to do it.

Pathology may give rise to excessive distraction of attention. In pathologic cases the patient may tackle anything he comes across, but never finishes what he has started. This condition is often observed in the manic phase of the manic-depressive reaction.

In the depressive state of the same reaction the patient's attention is fixed on something, i.e., his consciousness is dominated by a certain range of ideas from which he can tear himself away and transfer his attention to something else only with great difficulty.

Instability and exhaustion of attention are observed in neurasthenia. The patients try to do something, but soon find that their attention is occupied with something else. This can be particularly clearly observed in reading a book. The patient attempts to read the necessary number of pages. He comprehends a few lines but soon he discovers that he is reading mechanically, while his thoughts are somewhere else. The pa-

tient makes another attempt at reading attentively and soon finds his thoughts wandering again.

Pathologic Physiology of Disorders of Volitional Activity. It has been found that concentration of attention gives rise to a dynamic focus of excitation in the cerebral cortex. Inhibition develops around this focus in accordance with the laws of negative induction. The strength of the focus of excitation depends on the state of the nervous system and the interest in the task on hand. According to the laws of induction, the stronger the focus of excitation, the stronger the inductive inhibition around it. It stands to reason that the person absorbed in some task may not notice anything about him (may not hear the noise of passing motor vehicles, may not hear the radio and even may not respond when called by name). The reason for it is that all stimuli which have no bearing on what the person is doing are transmitted to the inhibited area. In neurasthenia and a number of other diseases inhibition is diminished. In these cases even weak stimuli evoke a response reaction in the nerve cells. Clinically this is manifested in the loss of the patient's ability to concentrate on anything for any length of time and the constant distraction of his attention.

In a manic state the increase in volitional activity is due to the predominance of excitatory processes in the cerebral cortex.

Catatonic excitement is caused by inhibition of the cortex and inductive excitation of the subcortex.

MAIN SYNDROMES OF MENTAL DISEASES

The clinical picture of various diseases is often characterized by a certain combination of different symptoms. These combinations of symptoms are called *syndromes.*

The same syndromes may be observed in various diseases (for example, syndromes of disordered consciousness are seen in infections, cerebral traumas and tumours, etc.) or the syndromes may alternate in the course of one disease. The main syndromes of mental diseases are described below.

Syndromes of Consciousness Disorders

Consciousness is the highest form of reflection of the environment in the human mind. By a clear consciousness clinicians imply that the person is in the main properly oriented in his surroundings and time, and is fully aware of all his actions.

From the point of view of physiology consciousness is the result of the greatest activity of certain areas of the cerebral

cortex, these areas continuously expanding, narrowing and changing their outlines. At each particular moment consciousness embraces a certain range of ideas.

Consciousness disorders in which all aspects of mental activity are disturbed may be observed in pathology. The following are the main forms of consciousness disorders.

State of Sopor

In the state of sopor patients are less mobile and weakly react to surrounding stimuli. To elicit an answer, a question has to be repeated several times or asked more loudly than usual. The patients reply in monosyllabic phrases with long pauses and in most cases take no interest in their surroundings. The state of sopor may last from a few hours to several days and even longer. After this state has passed the patients can tell but little of what happened to them. The state of sopor is often observed in various diseases (typhus, pneumonia, head trauma, cerebral tumour, uremia, diabetes).

Pathophysiologically the state of sopor is associated with inhibition in the cerebral cortex, most probably the narcotic phase which requires strong stimuli to evoke response reactions.

Delirium

A delirious state is a sleeplike disturbance in consciousness with excitement. It is characterized by vivid visual hallucinations and illusions. Auditory hallucinations occur less frequently. The hallucinations are most commonly of a frightful nature. The patients are disoriented in place and time and sometimes fail to recognize the people around them or mistake them for others. They usually take an active part in the scenes of their hallucinations and their behaviour is often determined by the content of the hallucinations. The delirious state lasts on an average from a few hours to several days, usually increasing in severity towards evening. After termination of the delirious state the patient may be able to tell about some of his experiences.

Delirious states may be observed in infections, traumas and intoxications.

As in the other forms of consciousness disorders, delirium is characterized by incomplete inhibition in the cerebral cortex. Since delirium is accompanied by hallucinations, it may be assumed that in certain areas of the cortex inhibition is in the equalizing or paradoxical phase.

Amential State

In cases of amentive consciousness disorders the patients are completely disoriented in their surroundings and are totally unaware of their own personality. They are unable to grasp the relations between the surrounding phenomena and objects. Sometimes they are excited, but usually keep to their beds. They may have fragmentary hallucinations. They do not answer questions. The amential state may last several weeks. Its termination is followed by total amnesia. Amentia is observed in cases of emaciation, infections and intoxications. Examination of higher nervous activity reveals exhaustion of the processes of excitation and inhibition.

Comatose State

This state is a manifestation of the deepest possible disturbance in consciousness. The patients do not answer any questions at all and do not even react to pain stimuli. Their pupils are dilated and the reaction to light is absent. Pathologic reflexes not infrequently appear. The comatose state is observed in the same diseases as sopor. In this state total inhibition develops in the cerebral cortex.

Twilight State

The clinical picture of the twilight state varies very widely. The common factor is that this state most frequently develops suddenly and terminates as suddenly. In some cases this state is confined to a narrowing of the field of consciousness—the patients may wander through streets, answer questions and automatically do simple work without being aware of it. In other cases this state is combined with hallucinations, the behaviour of the patients being determined by the content of their hallucinations. Sometimes the patients imagine that they are being attacked, that somebody wants to kill them. They begin to defend themselves or in fear take to flight. In such cases they may commit an offensive. The twilight state may last from a few minutes to several days or even weeks. Its termination is followed by amnesia—the patients are unable to recall anything that happened to them. The twilight state is observed in epilepsy, hysteria, traumas, etc. In hysteria it does not narrow the field of consciousness very greatly and does not produce total amnesia.

Syndromes of Motor Disturbances

Stuporous States

Stupor is a state of complete or partial immobility. Several forms of stupor are distinguished, including depressive, psychogenic and catatonic.

Depressive stupor is most commonly observed in the manic-depressive reaction, in which cases the patients are scarcely able to move. It is very difficult to get them to answer a question; sometimes the patients have to be fed from a spoon. The face wears a mask of woe and grief (Fig. 45).

In psychogenic stupor the patients are also immobile and silent, but when the traumatizing situation that has evoked their state is discussed in their presence they manifest a certain emotional and vegetative reaction—blush, turn pale, cry.

Catatonic stupor is most frequently observed in the schizophrenic reaction and is manifested in total immobility. In this form of stupor the muscle tone may vary. In some cases it is low (flaccid stupor) (Fig. 46) and the lifted arm drops passively, in others the stupor involves an increase in muscle tone; in the latter cases it is either very difficult or absolutely impossible to alter the patient's position. Sometimes the muscle tone in

Fig. 45. Pose and countenance of patient with depressive stupor

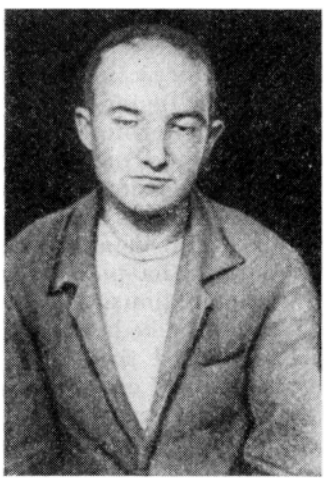

Fig. 46. Patient with sluggish stupor

catatonic stupor is such that the patient may be placed in any posture in which he seems to freeze. This phenomenon is known as waxy flexibility or catalepsy. In addition to the schizophrenic reaction, catatonic stupor may be observed in infections and intoxications. It lasts from a few hours to many months. During the state of stupor the patients often refuse food and therefore have to be fed through a tube.

From the point of view of pathologic physiology all forms of stupor are due to development of inhibition in the motor parts (motor analyser) of the cerebral cortex, the inhibition not infrequently spreading over the subcortex and brain stem.

States of Motor Excitement

In psychiatric practice it is often necessary to deal with manic and catatonic excitement. In *manic excitement* the patients are constantly on the move and cannot keep still a single moment. All their actions have a certain purpose, but owing to the excessive distraction of their attention they never finish anything they have started. The patients talk a lot and sometimes so fast that they omit words and phrases; the voice may become hoarse. They pester those around them with various questions and propositions.

In daily practice a milder form of a manic state, the so-called hypomanic syndrome, is more commonly observed.

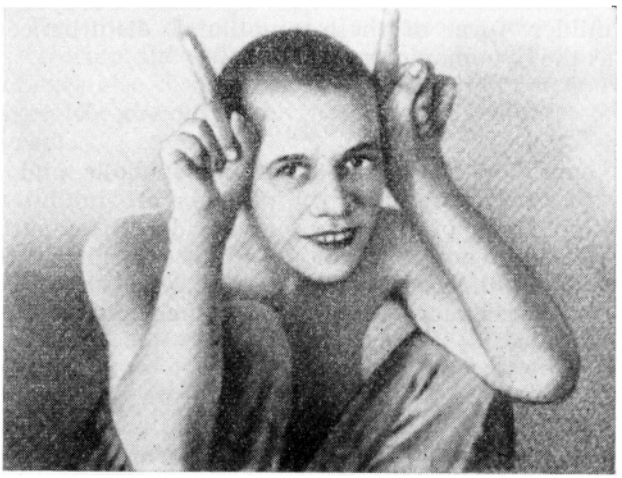

Fig. 47. Bizarre pose of patient in hebephrenic excitement

Manic excitement is observed in the manic-depressive reaction.

In *catatonic excitement* the patients perform purposeless, unnatural, and stereotype unintentional movements. Sometimes the motor excitement affects separate groups of muscles; for example, with totally immobile legs the patient moves his arms, grimaces and utters various words. The patient's speech is inarticulate. Catatonic excitement is observed in the schizophrenic reaction.

The pathophysiologic mechanisms of catatonic excitement will be discussed in the chapter on the schizophrenic reaction.

Hebephrenic Excitement. This condition is marked by mannerisms and silliness, the patients assuming unnatural poses (Fig. 47), sometimes laughing, grimacing, etc., without any reason. They may be aggressive. They twaddle and distort words. The pathophysiologic characteristics of hebephrenic excitement are discussed in the chapter on the schizophrenic reaction.

Syndromes of Emotional Disturbances

Manic Syndrome

The patients are in high spirits. They overestimate their potentialities and abilities, and become overactive; all work appears easy and simple. Their ideas run a fast course. The patients are overtalkative and are in the aforedescribed state of motor excitement; they sleep very little and yet are not tired. A milder form of these emotional disturbances is referred to as the hypomanic syndrome.

Depressive Syndrome

In this condition the patients are melancholic and see the dark side of everything; their movements are inhibited. They often develop ideas of guilt and reconsider their past which appears evil and dismal to them. They harbour suicidal thoughts and refuse food; their sleep is disturbed. The state of melancholy is sometimes more intense in the morning; the evening brings some relief.

Anxiety-depressive Syndrome

The melancholic mood is combined with anxiety and apprehension of some misfortune. The patients can neither keep still nor do anything; their appetite and sleep are disturbed. There

may be attempts at suicide. This syndrome is characteristic of patients with presenile psychoses (Fig. 48).

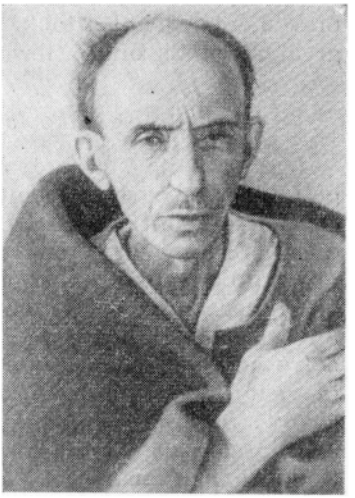

Fig. 48. A troubled and melancholy countenance of patient with presenile psychosis

Convulsive Syndromes

Two convulsive syndromes—epileptic and hysteric—have mainly to be dealt with in psychiatric practice. The convulsive seizure in epilepsy is called epileptic. Analogous seizures observed in other conditions, for example, in head trauma, cerebral syphilis, cerebral arteriosclerosis, etc., are called epileptiform.

Epileptic and Epileptiform Seizures

During the seizure the patient suddenly loses consciousness and falls, his face turns pale and then cyanotic. Tonic spasm manifested in tension of all muscles of the body immediately follows. Within 30-40 seconds the tonic spasm is replaced by clonic spasm (alternate contraction and relaxation of the muscles). The clonic spasm lasts 1-2 minutes and terminates the seizure. The total duration of the seizure does not exceed 5 minutes. During the seizure the pupils do not react to light; other reflexes also disappear. The patients not infrequently hurt themselves (for greater details on epileptic seizures see chapter on epilepsy).

Hysterical Attack

The onset of a hysterical attack is most commonly connected with certain external factors. A hysterical attack does not develop so suddenly as an epileptic seizure. In falling the patients do not sustain such severe injuries as do those in epileptic seizures. During the attack hysteriacs retain their reflexes and their pupils react to light. Consciousness is not completely lost; sometimes the field of consciousness is only narrowed. The patients react to their surroundings. The spasms do not occur in such strict succession as they do in epileptic seizures, but may combine with various, sometimes complex and expressive

movements. The attack sometimes lasts several hours (for greater details on hysteric seizures see chapter on hysteria).

Korsakov's (Amnestic) Syndrome

The patients suffer from a peculiar memory disorder—forgetfulness of current events and remembrance of the past. They cannot commit anything to memory. They even forget the questions they are asked and cannot tell what they did but a few minutes before, who visited them, etc. This syndrome is also characterized by confabulation and disorientation in time and place. At the same time the patients can, in some cases, solve complex problems, if all the conditions are in their field of vision. This syndrome is part of the clinical picture of Korsakov's psychosis, but may also be observed in cases of cerebral arteriosclerosis, senile psychosis, traumas, infectious diseases and intoxications.

Hallucinatory-paranoid Syndrome

This syndrome is characterized by hallucinations and delusions. The delusions are sometimes based on the hallucinations. Usually the patients express ideas of persecution and influences. For example, a patient hears that some people in the adjoining room are plotting to kill him. In such a case some patients seek safety in flight, others prepare for defense—lock the doors and arm themselves, still others call for help. The hallucinatory-paranoid syndrome occurs in alcoholic psychoses, cerebral syphilis, the schizophrenic reaction and other diseases.

Dementia Syndrome

This syndrome is characterized by a diminution in the patients' intellectual faculties often combined with memory disturbances. The patients are unable to learn anything new and begin to forget what they know. The powers of comprehension are sharply impaired.

The patients may be unable to cope with the simplest everyday tasks, in virtue of which their behaviour becomes absurd. For example, one patient with this syndrome cut his books in halves in order to increase his library. Dementia is observed mainly in organic diseases of the brain—general paresis, senile dementia, cerebral arteriosclerosis, etc. (for greater details on the dementia syndrome see the chapters on disorders of thinking, and senile psychoses).

Neurotic Syndromes

Neurasthenic Syndrome

The patients easily tire, become irritable and find it difficult to control themselves. Their sleep is disturbed—they cannot fall asleep for a long time after going to bed or awaken too early in the morning. They are readily awakened by the slightest noise since their sleep is very light and are not refreshed by sleep as are healthy people. They may feel sleepy during the day.

The patients are excessively sensitive to any pain stimuli. They become impatient and find it difficult to wait for anything. Their attention is impaired. Most commonly they are in low spirits and unsure of themselves. This state is characteristic of neurasthenia, but may also be observed in the incipient stages of a number of other diseases. General paresis, cerebral syphilis, cerebral arteriosclerosis and the schizophrenic reaction may begin with the neurasthenic syndrome. The same syndrome is sometimes observed in cases of overstrain, especially if it was accompanied by emotional stress, insufficient sleep, inadequate diet, etc.

Pathophysiologically this syndrome is based on weakened cortical processes—excitation and internal inhibition. Anything conducive to weakening of these processes may therefore provoke the neurasthenic syndrome.

Hypochondriac Syndrome

The patients are overapprehensive of their health, complain of phantom diseases and maintain that they will die unless urgent measures are taken. As a rule, they complain of morbidity of the abdominal organs and the heart. Their spirits are low. They are distrustful of the physician's assurances that their health is in no danger. To ascertain the correctness of the physician's statement, they sometimes consult other specialists and read special literature.

Hysterical Syndrome

This syndrome is nearly always marked by excessive and unstable emotional reactions. The patients cry and laugh loudly. The transition from one state to the other is very rapid. Their ideas are usually considerably influenced by their emotions, for which reason the hysterical syndrome is not infrequently characterized by so-called emotional logic, i.e., the patients' attitude to certain questions is determined exclusively by the

state of their emotions. In other words, the patients' actions are guided by their feelings rather than their intellect. The patients demand greater attention and behave so as to attract attention. They are inclined to fantasy. Various disturbances, which may be characterized as consciousness disorders and somatic symptoms, and sometimes convulsive seizures are observed (for greater details on hysterical manifestations see chapter on hysteria).

The hysterical syndrome may be observed in a number of diseases—head traumas, the schizophrenic reaction, intoxications, etc. Any disease involving weakness of cortical processes may be accompanied by the hysterical syndrome. As I. Pavlov pointed out, the hysterical syndrome is pathophysiologically based on weakness of the cortex with predominant weakness of the second signal system and predominance of the first signal system and subcortical activity over the cortical activity.

MENTAL DISEASES

CLASSIFICATION OF MENTAL DISEASES

Until the end of last century only symptoms were taken into consideration in the classification of mental diseases; this principle of classification was therefore called symptomatic.

Subsequently the nosological principle was suggested. It is by this principle which primarily considers the etiology and pathogenesis of diseases that we now guide ourselves.

Psychiatry studies the following diseases and developmental anomalies:

1. *Psychoses associated with infectious diseases:*

(a) mental disorders in acute infectious diseases (typhus, pneumonia, influenza, etc.);

(b) mental disorders in chronic infectious diseases (cerebral syphilis, general paresis, epidemic encephalitis).

2. *Psychoses associated with intoxication:*

(a) mental disorders in occupational intoxications (lead, tetraethyllead, carbon monoxide);

(b) narcomanias (chronic alcoholism, delirium tremens, Korsakov's psychosis, morphinism, etc.).

3. *Mental disorders associated with traumatic injury to the brain:*

(a) acute traumatic psychoses;

(b) traumatic encephalopathy.

4. *Mental disturbances in somatic diseases:*

(a) mental disturbances in heart diseases;

(b) mental disturbances in diseases of the abdominal organs.

5. *Mental disorders in vascular diseases:*

(a) cerebral arteriosclerosis;

(b) hypertensive vascular disease.

6. *Mental disorders at the age of involution:*

(a) presenile psychoses;

(b) senile psychoses.

7. *Schizophrenic reaction.*

8. *Manic-depressive reaction.*

9. *Epilepsy.*

10. *Neuroses:*
(a) neurasthenia;
(b) psychasthenia;
(c) hysteria;
(d) obsessive reaction.
11. *Psychopathias.*
12. *Mental retardations.*

Due regard for the etiological factors in the development of a mental disease makes it possible to search for appropriate therapeutic and prophylactic measures.

MENTAL DISTURBANCES IN DISEASES OF THE INTERNAL ORGANS, ACUTE INFECTIOUS DISEASES AND INTOXICATIONS

Mental Disturbances in Internal and Infectious Diseases

Some somatic diseases, especially acute infections, are accompanied by mental disturbances which vary in intensity and which sometimes produce a picture of a psychosis. Psychoneurotic disorders are often observed in acute and protracted intoxications with alcohol, drugs, industrial poisons and certain other substances.

We shall briefly consider some forms of mental disturbances occurring in somatic diseases. It is well known, for example, that patients with heart diseases sometimes exhibit the following mental disturbances: changes in the mood (low spirits), worry and fear. In cases of decompensation such patients may have hallucinations and sometimes consciousness disturbances. Upon improvement of the physical condition and normalization of circulation all mental disturbances usually disappear. The medical workers of general somatic hospitals have to bear these changes in mind because such patients must be administered aid locally and do not have to be placed in mental hospitals.

Rheumatic joint and heart diseases are sometimes also accompanied by psychoneurotic disturbances. As a rule, such patients are very irritable and impatient; they cry readily and sleep lightly. Sometimes they suffer from illusions, especially during the evening hours before falling asleep. Rheumatism is much less frequently accompanied by acute psychoses involving psychomotor excitement, hallucinations and consciousness disorders.

Malignant tumours (carcinoma and sarcoma) sometimes lead to development of an amential state or delirium. This is most commonly observed in far advanced stages of the disease with

a picture of severe intoxication and emaciation. Usually such mental disturbances occur mainly during evening hours and do not last long (K. Skvortsov).

Protracted emaciating gastrointestinal diseases are marked by sluggishness, excessive fatigue, sleepiness and irritability. In children infestation with helminths may sometimes give rise to epileptiform seizures and attacks of consciousness disorders.

Acute infectious diseases (typhus, typhoid fever, malaria, croupous pneumonia, etc.) may be accompanied by mental disturbances. The picture most commonly developing in these cases is that of *infectious delirium*. The main signs of this state are consciousness disorders with disorientation in place and time and retention of the consciousness of one's own personality, the patient remembering his first and last names and occupation. Visual hallucinations, illusory perception of surrounding objects, fragmentary delusional statements and prolonged excitement of the patients are typical. Careful observation of such a patient's behaviour suggests that he is having frightful experiences. The patient often thinks he is attacked by beasts and terrible monsters, and everything around him collapses and perishes. He is under the impression that some people are trying to do away with him; he is being beaten up, cut up, etc. His face expresses terror or fear. He tries to hide, to defend himself from the assailants, rushes to the door, window, etc. In infectious delirium the delusions are unstable. The aforedescribed phenomena usually arise during high fever and disappear when the temperature drops; in individual cases they appear before the rise in temperature and persist after its drop. In a few days the delirium usually terminates in complete recovery. Sometimes residual phenomena—general mental weakness and fragmentary delusional statements—are observed; this is so-called *residual delirium* which also completely disappears in a few days. Upon termination of the delirium the patients usually relate their experiences of which they are completely critical.

In cases of deeper clouding of consciousness the patients with acute infectious diseases may develop an *amential state* (acute confusion). As in delirium this state is accompanied by illusions, hallucinations and fragmentary delusions. The patient is not only disoriented in his surroundings, but is even unable to give his name.

It is not always easy to determine whether the patient is affected with delirium or amentia, and this condition is therefore often referred to as a mixed amential delirious state. Amentia is also characterized by a disturbance in integral perception

of objects. The patients perceive but separate aspects of an object and cannot form a picture of the object as a whole. As in delirium, the condition is marked by motor excitement. The patients shout, sometimes try to flee from the ward, perform a number of disorderly movements, etc. At the end of the amential state they do not, as a rule, remember anything that came to pass. This is another sign that amentia involves deeper consciousness disorders than does delirium. The amential state lasts an average of several weeks. After an acute infectious psychosis, or even without it, the patients often suffer from *postinfectious mental debility* manifested in excessive fatigue, irritability and headaches; the patients are barely able to exert even the slightest effort and rapidly tire from a short conversation. They find it difficult to concentrate their attention, become considerably emaciated and readily cry. Noise and bright light irritate and tire them. They are often forgetful of current events, and their powers of comprehension are impaired. These phenomena gradually disappear together with the physical weakness.

Treatment. Upon the onset of a delirious or amential state it is, above all, necessary to continue the treatment of the underlying infectious disease. The patients must not be transferred to a mental hospital. To control delirious and amential states, intravenous infusion of physiologic saline solution, a 40 per cent glucose solution and magnesium sulfate is recommended. All this is conducive to detoxification. To eliminate the excitement, a 10 per cent chloral hydrate enema (20 ml per enema) and barbiturates in suppositories are administered, and a magnesium sulfate solution and a 10 per cent hexobarbital solution (up to 10 ml) are injected intramuscularly. The cardiovascular function and respiration must be carefully watched, and cardiacs, when necessary, administered. Such patients need careful nursing and close watching since, under the effect of their hallucinations and delusions, they may do themselves severe physical harm, jump out of the window, etc. A special medical attendant must be on duty at their bedside 24 hours a day.

Mental Disturbances in Acute and Chronic Intoxications

Mental Disturbances in Alcoholic Poisoning

Alcohol is a narcotic substance. After ingestion alcohol first affects the functions of the central nervous system. According to the experimental research of Pavlov's pupils, higher nervous activity is affected even by small doses of alcohol. Alcohol has

been shown to depress the processes of both excitation and inhibition. Internal inhibition is affected the most, which leads to predominance of the excitatory processes in the brain. Hence, the mental changes observed in drunken people.

In such people the attention diminishes and the movements lose their precision; the quality of mental work is particularly affected. Their speech becomes louder and they display unwarranted bravery, boastfulness, undue familiarity, etc. All the aforesaid takes place in cases of so-called *simple intoxication.*

Forensic psychiatrists sometimes have to do with so-called pathologic intoxication which is accompanied by a temporary (acute) mental disorder. Such intoxication is characterized by a severe clouding of consciousness, disorientation in the surroundings and sometimes unawareness of one's own personality, while the physical signs of intoxication are barely noticeable. As a rule, pathologic intoxication is accompanied by marked emotions of rage, fury and fear. Under the effect of hallucinations and delusions such a person may perpetrate gravy crimes. The termination of this state is sometimes followed by deep and long sleep with subsequent amnesia of the preceding events. Pathologic intoxication may result from ingestion of even a small dose of alcohol. A head trauma sustained in the past, a survived severe disease, protracted insomnia and psychic trauma may be the factors conducive to the onset of this grave and dangerous condition.

Frequent excessive use of alcohol may lead to habituation with chronic alcoholism as the result.

Chronic alcoholism is a morbid state due to systematic hard drinking, characterized by irresistible craving for alcohol and resulting in mental and organic changes. One of its most common signs is insufficiently deep sleep which is often accompanied by nightmares. Increased irritability, impatience and quick temper are observed. The alcoholic's mood easily changes from friendly civility to marked rage. The range of interests diminishes, the alcohol addict treats those around him (particularly his family) rudely and cynically, his memory is impaired, he ceases to attend to his appearance, becomes slovenly and deteriorates morally. Alcoholics never blame themselves, but those around them for their condition; it is their wives, their superiors at work and others who "drove" them to drink. They become morbidly suspicious and distrustful of the people surrounding them. Their working capacity diminishes. They often allow themselves strange, coarse, inappropriate and dismal jokes.

The condition is marked by a peculiar trembling of the fingers owing to which the alcoholics must quit work requiring

fine and precise movements (for example, watchmaking, typesetting); they develop pains and subsequent weakness in the arms and legs.

Chronic alcoholism frequently affects the gastrointestinal tract (chronic gastric catarrh), liver (cirrhosis) and cardiovascular system. For example, according to statistics, mortality from cirrhosis of the liver is almost 10 times as high among alcoholics as it is among other people. The assimilation of vitamins contained in the food is impaired with the result that some form of avitaminosis develops. The defensive powers of the organism are weakened and alcoholics frequently contract influenza and other infectious diseases.

The looks of an alcoholic also denote considerable changes in his physical condition. As a rule, alcoholics look older than their age. The face is puffy, crimson or sallow; the skin on the face is wrinkled and flabby.

Mortality among alcoholics is 3 times as high as it is among people who do not drink alcoholic liquor.

The pathologic craving for alcohol is sometimes of a periodic character. The patient may not drink any alcoholic liquor for several months, then he is suddenly overwhelmed by an irresistible craving for alcohol and drinks for many days and weeks on end. Usually no persuasion can stop the drinking spree. The alcohol addict stops working and, if he has no money for liquor, sells his own personal effects and those of his family, and sometimes perpetrates crimes. The drinking spree is often preceded by a dejected, melancholy mood that arises without any apparent reason. The patient seeks escape in liquor. The above-described recurrent drinking sprees are referred to as *dipsomania*. To terminate the spree, it is desirable that the patient should be placed in a mental hospital and be given appropriate treatment.

Treatment. After beginning treatment of chronic alcoholism the patient must totally abstain from any alcoholic liquor. The various disturbances sometimes occurring in connection with this abstinence are eliminated by drugs, physiotherapy and other agents. It is very important to normalize the patient's sleep, for which purpose the patient is administered hypnotics, aminazine (chlorpromazine), warm baths before sleep and sometimes mild cardiacs. At the same time measures are taken to eliminate the poisonous substances from the organism. Intravenous infusions of glucose and urotropin are prescribed, and the patient is treated with oxygen.

Since phenomena of avitaminosis are often observed in alcoholics, the latter are given injections of vitamins B_1, C and nico-

tinic acid. In the beginning of the treatment the patient is prescribed a vegetable and dairy diet.

The second stage of the treatment consists of measures aimed at suppressing the craving for alcohol. For this purpose the method based on Pavlov's physiologic theory is now widely used. The method strives to elaborate a negative conditioned reflex (vomiting reflex) to alcohol by means of apomorphine. This is accomplished as follows. About 5-10 minutes before the injection of apomorphine the patient is given to drink 500-600 ml of water. A few minutes after the injection an unpleasant sensation appears, the patient feels nauseated and begins to salivate. At this moment the patient is asked to smell the alcoholic beverage of which he most frequently partook. The nausea increases. The patient is then given 30-50 g of alcohol to drink, which usually coincides with the vomiting reaction to apomorphine. This procedure is repeated several times with the result that a negative conditioned reflex is formed—the patient vomits at the mere odour of liquor, even without seeing it and without any injection of apomorphine. It is recommended that the elaborated conditioned reflex vomiting reaction should subsequently be reinforced from time to time (in a dispensary or clinic). In addition to apomorphine, other preparations (antabuse, antethyl) which likewise suppress the craving for alcoholic liquor are also used. Psychotherapy and hypnosis are widely employed in the treatment of alcoholics. The patient is suggested faith in recovery and is given to understand that he can achieve success in the treatment only through his own perseverance. The patient is told about the harm of alcohol and given concrete examples of effective treatment. By means of hypnosis the patient is suggested an aversion for alcohol and given encouragement conducive to improving his general condition (better sleep, good appetite, high spirits, etc.).

Chronic alcoholism and accumulation of poisonous substances sometimes give rise to acute alcoholic psychoses which include delirium tremens and acute alcoholic hallucinosis.

Delirium tremens is an acute psychosis, very dangerous for both the patient and those around him. It may be precipitated by head trauma, certain infectious diseases (for example, pneumonia), protracted insomnia, severe emotional stress. Delirium tremens is always preceded by disturbed sleep with nightmares. As a rule, the disease sets in in the evening, in the middle of the night or very early in the morning. This psychosis is characterized mainly by a peculiar disturbance in consciousness. The patient is disoriented in his surroundings, although sometimes he knows his name. Actual reality seems to be screened by

numerous vivid visual hallucinations which make up whole scenes (Fig. 49). Believing his visions to be real the patient experiences terror, tries to hide or attacks his "enemies" and often sees various large and small animals and insects which assail him and bite him. Sometimes he sees devils which rail at him, make faces and threaten him. In addition to hallucinations, such patients have a distorted perception of real objects and persons (illusions). The patient takes the persons he knows well for enemies, certain objects—for weapons, the shadows on the walls—for faces of terrible monsters, etc. Besides visual hallucinations the patient may also have auditory hallucinations —he hears voices which threaten to lay hands on him, kill him. Not wishing to "give up" such patient either attacks on his own or "flees from his assailants" and sometimes severely hurts himself, gets hurt or crippled. Sometimes it is possible to establish brief personal contact with the patient and he calms down, but soon everything recurs with the former intensity. The patient experiences fear and dispair which transform into rage and fury.

In addition to fever, delirium tremens is characterized by intense trembling of the hands and often of the whole body. The eyes have a feverish lustre, the face is pinched, the mouth is dry, the heart palpitates and the respiration is fast. Usually this psychosis does not last long—not more than a few days. It terminates in long sleep after which the acute phenomena disappear.

Fig. 49. Hallucinatory scene perceived by delirium tremens patient and drawn by him upon recovery

Transmarginal, protective inhibition in the cerebral cortex in response to intoxication is the pathophysiological basis of delirium tremens; it is against this background that states of partial inhibition (hypnotic phases) develop and the excitatory process weakens.

Treatment. The delirium tremens patient must be urgently placed in a mental hospital if this disease has started at home, in the street, etc. In the event delirium tremens has appeared in a hospital, while the patient is affected with some severe somatic disease, it is desirable that the patient should be given treatment and carefully watched 24 hours a day without being transferred to a mental hospital. The most reliable method of treatment is induction of sleep by means of hypnotics, for which purpose the following prescription suggested by Y. Popov is frequently used.

Rp. Luminali 0.4
Spiritus vini rectif. 10.0
Aq. destill. 100.0
MDS. Single dose

If the patient fails to fall asleep, an enema with chloral hydrate (20 ml to a 10 per cent solution in 50 ml of water for a single dose) or an intravenous injection of 10 ml of 10 per cent solution of hexenal (hexobarbital sodium) is recommended. Chlorpromazine (2-3 ml of a 2.5 per cent solution twice a day

Fig. 50. Patient hears behind the wall voices of three men arranging to kill him. Patient has made ready to defend himself

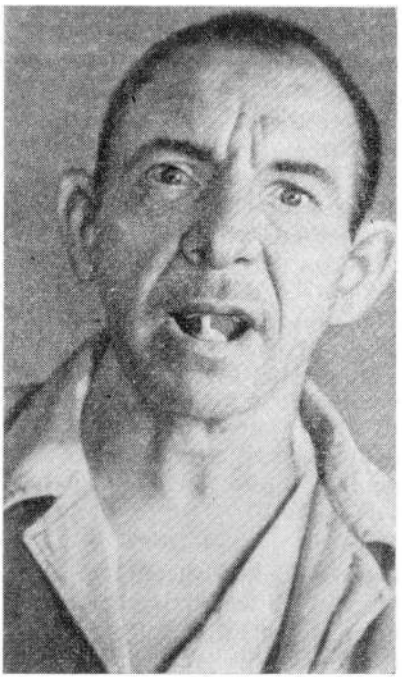

Fig. 51. Patient hears voices which insult him

Fig. 52. Patient hears voices which please him

intramuscularly) is administered with good effect. After prolonged sleep (12-15 hours and longer) the psychosis, as a rule, passes off. While treating such patients it is necessary carefully to watch their cardiovascular functions and, if need be, administer cardiacs. Protracted residual phenomena in the form of persistent auditory hallucinations are sometimes observed.

Alcoholic hallucinosis manifests itself in auditory hallucinations, usually of an unpleasant and frightful character, the consciousness remaining practically clear. Because of the hallucinations the patient has a perverted perception of the surroundings. He hears voices which guide all of his behaviour, rule over him, mock at him, rail against him and threaten to do away with him (Fig. 50). In this condition the patient may do things that put his life in jeopardy. Sometimes he hears dialogues in which all of his past life is analysed, some voices saying only bad things about him ("he is a criminal, an unworthy person, a drunkard and thief, and has to be done away with") (Fig. 51), while other voices defend him ("he will reform yet, we must

forgive him, he is a good man"), etc. (Fig. 52). Alcoholic hallucinosis may be acute or chronic. In the latter case the hallucinations persist for months and sometimes years. This disease is extremely distressing to the patients.

Treatment. As in delirium tremens the patient must be urgently placed in a mental hospital. The treatment begins with administration of preparations which weaken the hallucinatory manifestations—caffeine, adrenalin and atropine. Sleep and aminazine (chlorpromazine) therapy are administered for the same purpose.

Subsequent treatment is the same as in chronic alcoholism.

Alcoholic psychoses characterized by severe memory disorders combined with polyneuritis are observed less commonly. Such a psychosis was for the first time described by the outstanding Russian psychiatrist S. Korsakov in 1889 and is known as *Korsakov's psychosis.* The patient's memory for current events is sharply impaired. For example, the patient does not remember who has just visited him and whether or not he has seen the physician today, does not know what he ate today, is unable to recall what he has just read, etc. Such patients are inclined to false reminiscences (confabulation). This psychosis is chronic.

Delusions are very serious mental disturbances produced by chronic alcoholism. Most commonly it is an *alcoholic delusion of jealousy.* The patient begins to suspect his wife of infidelity and to spy on her. Because of his mistrust and suspicion of the people around him he interprets everything pervertedly and sees in everything "incontrovertible proof" of his wife's infidelity. The patient locks her up when he goes to work, often beats her and tries to make her confess her infidelity, sometimes attacks the imaginary lover, etc. An essential part in the development of such a delusion in alcoholics is played by disorders of the sexual function—sexual weakness or impotence while sexual desire is retained or even increased. This mental disorder usually lasts very long and often leads to divorce.

Chronic poisoning with alcohol (especially hard liquor) sometimes results in epileptiform seizures; in literature this disorder is referred to as *alcoholic epilepsy.* The treatment is the same as in chronic alcoholism.

Morphinism

Morphinism is one of the forms of narcomania manifested in an irresistible craving for preparations of the opium group (morphine, pantopon, etc.). As in other narcomanias (cocainism, hashishism, etc.), prolonged use of the narcotic leads to gradual

habituation. The habit is not infrequently acquired by persons to whom this preparation was often administered as an analgesic because of some somatic disease. Analogous habituation may also develop in cases of continued use of promedole (4-phenyl-4-propoxy-1,2,5-trimethyl-piperidine hydrochloride) and barbiturates, for example, barbamyl (amytal sodium).

In persons habituated to morphine even temporary forbearance from it causes a number of distressing symptoms known as *abstinence symptoms*. The symptoms are as follows: low spirits, sluggishness, dizziness, tachycardia, diarrhea, disturbed sleep, fears. During the period of abstinence the patients use all possible ways and means to get the narcotic. If such a patient has voluntarily come to a hospital with a firm intention to get rid of his affliction, under the effect of the aforementioned symptoms after a few hours of abstinence he categorically demands either that he be given morphine or be discharged from the hospital. Sometimes such patients simulate an attack of pains in the abdomen, heart, etc., so as to receive the narcotic.

In course of time the former small amount of morphine no longer satisfies the patients and they increase the dose to several grams a day. This leads to chronic poisoning of the organism manifested in a number of somatic and mental disturbances. As a rule, morphine addicts look emaciated and have a poor appetite. Their skin is dry and flabby. They suffer from tachycardia, poor sleep and tremor of the fingers. Their will is weakened and the working capacity is considerably reduced. They become mendacious and emotionally unstable. Their mental efficiency and memory are impaired. Their mendacity may be seen in the following example. Entering a hospital for treatment the patients sometimes smuggle in narcotics and for some time use them secretly. In their letters to friends and relatives they plead and threaten in the hope of obtaining morphine. Some of them make attempts at stealing the narcotic available in the hospital. The skin of such patients often shows scars—traces of former abscesses—because the patients often make their own injections disregarding all rules of asepsis, for example, using an unsterile syringe and injecting the narcotic through the clothes.

Man's nervous system plays an important part in the development of narcomania in cases of systematic use of morphine. It has been found that it is people with a psychopathic personality who most commonly become narcomaniacs.

Treatment. Morphinism is treated with great difficulty; the most important part of the control of this grave disease is its prevention. Systematic prescription of morphine must be care-

fully considered. It is absolutely prohibited to give the patient morphine at his own request. In cases of conflict the nurse must consult a physician and never decide that one more injection will "make no difference". Morphinism must be treated in a mental hospital under strict supervision; the entire medical personnel must be instructed carefully to watch the patient. The things received by the patient from the outside (brought by visitors) must be thoroughly examined because they may contain narcotics (for example, one patient was brought a pack of cigarettes with an ampule of pantopon in each one). As a rule, administration of narcotics to physically normal patients must be discontinued at once; in individual cases during the first days the patients are given injections of decreasing doses of the narcotic to which they have become habituated. To eliminate the abstinence phenomena, sleep therapy is sometimes used. A good effect is produced by administration of small and medium doses of insulin combined with infusions of glucose. Positive results have lately been achieved by aminazine treatment (2 ml of a 2.5 per cent solution intramuscularly during the day and for the night). Bromides, cardiacs, physiotherapy (warm baths) and psychotherapy (hypnosis) are widely used.

Mental Disturbances in Intoxication with Industrial Poisons

Intoxication with industrial poisons is now a rare occurrence owing to the joint activities of labour protection agencies and sanitary services. Nevertheless, it is necessary to know the most common industrial poisons for purposes of prophylaxis and identification of early forms of intoxication. These include lead, carbon monoxide, mercury, manganese, antifreeze and benzene. The initial signs of intoxication are more or less common for all the aforesaid substances, namely, indisposition, weakness, headaches, dizziness, gastrointestinal disturbances (poor appetite, diarrhea or constipation), poor sleep, irritability.

The subsequent signs are characteristic of the particular form of intoxication. For example, in addition to the foregoing initial symptoms, lead poisoning is marked by impaired memory and apathy, sometimes epileptiform seizures, polyneuritides and a lead line on the gums.

Various branches of industry are now widely using *tetraethyllead*. The first signs of poisoning with this substance are headaches, poor sleep and general debility. Later symptoms include tremor of the hands, speech disorders (dysarthria), etc. In some cases this form of intoxication gives rise to an acute psychotic

condition with consciousness disturbances (sopor, delirium) and imperative auditory hallucinations. Characteristic tactile hallucinations—a feeling of hair in the mouth and throat—are also observed. Severe cases of tetraethyllead poisoning may end lethally. The treatment consists in intravenous infusions of 15-20 ml of a 40 per cent glucose solution combined with 5 ml of a 25 per cent magnesium sulfate solution, infusions of physiologic saline solution, and warm baths. The patients are given luminal (0.1 g 2-3 times a day).

Carbon monoxide poisoning is characterized by headaches, pallor and vomiting. A picture of delirium with marked motor excitement sometimes develops. Severe carbon monoxide poisoning may result in an amnestic symptom complex.

The victim of acute carbon monoxide poisoning must be taken outdoors. Inhalation of oxygen and subcutaneous administration of caffeine are indicated. Bloodletting with subsequent intravenous administration of physiologic saline solution is sometimes resorted to.

PSYCHOSES BASED ON SYPHILIS OF THE NERVOUS SYSTEM

Syphilis sometimes affects the brain, giving rise to cerebral syphilis and general paresis.

Cerebral Syphilis (Lues Cerebri)

Cerebral syphilis develops within 3-4 years of the moment of infection in cases where the patient received inadequate treatment or no treatment at all. The disease most commonly occurs at the age of 25-40, the clinical picture varying very widely, according to localization and character of the cerebral affection.

Syphilitic neurasthenia is one of the relatively early manifestations of neurosyphilis. It is characterized by headaches, disturbed sleep, increased fatigability and irritability. Sometimes the patients have pains in various parts of the body. These pathologic disorders are traced to an infectious-toxic affection of the nervous system. This form of syphilis is also marked by certain neurological disturbances manifested in inequality in the diameter of the pupils, altered reflexes and appearance of meningeal symptoms. Wassermann test of the cerebrospinal fluid is, as a rule, positive. Specific treatment usually eliminates the neurologic symptoms and the patients' condition considerably improves.

The meningeal form usually develops acutely; in some cases it is accompanied by a rise in temperature. The first and foremost in the clinical picture are symptoms indicating irritation of the meninges mainly of the base of the brain. The condition is characterized by headaches, nausea, vomiting and dizziness, depending on the severity of the affection. It often involves a clouding of consciousness. In bed the patients usually assume a forced position. Any movement intensifies the headache and pains in the back and sacrum. The meninges are affected the most. Sometimes paralyses and pareses of the extremities develop and the cranial nerves are affected. Wassermann test of the blood is positive in 50 per cent of the cases, and of the cerebrospinal fluid—nearly always. Specific treatment soon effects an improvement.

The apoplectic form is the result of affection of large vessels, which leads to repeated hemorrhages. The clinical manifestations are in the main determined by the extent and localization of the hemorrhage. Focal symptoms—paralyses of the eye muscles and extremities, and affections of cranial nerves are frequently observed. The condition is sometimes marked by ptosis (drooping of the upper eyelid). Some cases are characterized by a peculiar dementia, i.e., general mental normalcy with loss of certain mental functions. It should be noted that in such patients the effects of apoplexy disappear much sooner than in cases where apoplexy is the result of cerebral arteriosclerosis or hypertensive vascular disease. This is partly due to the fact that in cerebral syphilis the vessels are affected only in certain parts, the other parts remaining almost normal and therefore possessing considerable compensatory potentialities. The authors have observed patients who had had 8-10 apoplectic strokes. With the increase in the number of strokes the dementia gradually increases. Wassermann test is negative much more frequently than in the preceding forms.

Syphilis of the small vessels is characterized by disturbances in the mental functions and absence of marked local changes in the brain. The patients are often in low spirits and suffer from auditory (less frequently visual) hallucinations. Some cases are accompanied by stuporous phenomena. This form of syphilis involves affection of small arteries of various parts of the brain. Since the affection is of a diffuse character, mental disturbances come to the fore. Various catatonic symptoms (negativism, stereotypy, mutism) may also be observed.

Epileptiform syphilis is, as the term suggests, accompanied by epileptiform seizures. In addition, there are also neurologic symptoms, but epileptiform seizures are the leading clinical

aspect of the disease. No changes in personality characteristic of epilepsy usually develop.

The paranoid form is characterized by gradual development. The patients suffer from delusions of persecution and influence. The delusions are often combined with auditory hallucinations which are usually unpleasant. The patients frequently have a dual opinion of the hallucinations. On the one hand, they understand that the hallucinations are a result of the disease, but, on the other hand, they associate them with the existence of ill-intentioned people. Neurologic examination reveals a sluggish reaction of the pupils and their unequal size, and sometimes affection of the facial nerve. The disease runs a protracted course; remissions are possible. Specific treatment does not always achieve desirable results.

Cerebral syphilis in childhood is, as a rule, connnected with congenital syphilis. Intrauterine infection of the embryo or fetus with syphilis results in retarded development of the brain or the entire organism. Signs of syphilitic affection are usually manifested in the first years of the child's life. The clinical symptoms depend mainly on the organs that are primarily affected. There is a number of somatic signs—saddle nose, irregular dentition, microdontia (abnormally small teeth) and improper development of bones (thickening of the cranial bones and change in their form). Since the disease affects the developing brain, it results in its retarded or improper development, which leads to various degrees of oligophrenia (feeble-mindedness).

V. Gilyarovsky pointed out that the picture of cerebral syphilis in children is made up of mental deficiency characteristic of oligophrenia and symptoms of local affection of various parts of the nervous system.

Etiology. Cerebral syphilis has long been known to be the result of infection with the *Treponema pallidum.* As was already mentioned, this form of the disease affects the cerebral vessels and the meninges. Since cerebral syphilis is the third stage of syphilis, it is natural that it should manifest itself several years after the moment of infection.

The treatment of cerebral syphilis is specific. All the courses of treatment prescribed must be taken without fail.

The treatment usually includes intravenous injections of novarsenol (neoarsphenamine)—0.15-0.6 g—combined with intramuscular administration of bioquinol (3 ml every third day, 45 ml per course). Sometimes a course of inunction of strong mercurial ointment is added. Injections of penicillin (10,000,000-15,000,000 u) have of late been administered before the beginning of the specific treatment. General roborant ther-

apy is recommended. In some cases the patients are given Biett's mixture.

Rp. Hydrargyri bijodati rubri 0.1
Kalii jodati 10.0
Aq. destill. 200.0
MDS. 1 tablespoonful t.i.d., washed down with milk

The same agents are used in the treatment of cerebral syphilis in children as in adults. Bioquinol (up to 15 g per course of treatment) is used particularly frequently.

General Paresis
(Paralysis Progressiva Alienorum)

General paresis is a late syphilitic affection of the brain. Whereas in cerebral syphilis the vessels and meninges are the first to be affected, in general paresis the cerebral matter (parenchyma) is mainly involved. The disease begins 10-15 years after infection with syphilis, sometimes sooner. In some cases the disease develops later—20 years and more after the infection. General paresis usually attacks persons at the age of 35-50, but sometimes also children and adolescents. In the latter cases the infection occurs *in utero* or extragenitally. Men are affected somewhat more often. General paresis develops in about 3-4 per cent of all cases of syphilis. The development of the disease is favoured by the harmful agents which weaken the central nervous system (alcohol, cerebral trauma, etc.). It should also be noted that general paresis occurs most frequently in persons who were poorly treated for syphilis or were not treated at all. In the U.S.S.R. the general paresis incidence has considerably diminished. This is primarily the result of successful control of venereal diseases.

General paresis involves various parts of the central and peripheral nervous system. Progressive dementia is the principal and leading symptom in the clinical picture of the disease. The course of general paresis is customarily divided into *three stages* (1) neurasthenia, (2) dementia (marked clinical phenomena), and (3) marasmus. The division into stages is conditional and depends on predominance of particular symptoms in the clinical picture.

Stage of Neurasthenia. This is the initial stage of general paresis; identification of this stage is very important for timely diagnosis and treatment.

The patient cannot sleep, is excessively irritable and tactless, loses interest in his work and begins to exhibit primitive urges.

This stage is sometimes marked by diminished activity—energetic, active people become sluggish and passive. The patients may continue with their habitual work throughout this period, especially if it is not complicated, but as the disease progresses, they find it increasingly more difficult to cope with new tasks. The farther the disease advances, the greater the changes in the patients' moral make-up and the clearer the picture of organic dementia.

Dementia Stage. In this stage the patients not infrequently do incongruous things attesting their feeble-mindedness. They may give expensive presents to people they do not know very well and at the same time neglect their closest kin. Sometimes they display their concern for their closest relatives by making unnecessary purchases. For example, a patient spent all his savings on toilet water which he presented to his wife. Another patient made the rounds of shops spending all his pay on needles for primus-stoves. Some patients begin to steal, but because of their feeble-mindedness they do it also absurdly—they may take something from a counter before everybody's eyes.

The patients' memory and powers of comprehension continue to diminish to the point that a person with a higher education is unable to solve a simple arithmetical problem. The patients can no longer see anything wrong with their condition. Sometimes they cannot find their own lodgings and cease to recognize their relatives and friends. Against this background of organic dementia additional symptoms—delusions, depression, excitement, etc.—often appear. Various *forms* of general paresis are distinguished according to the prevailing symptoms.

The principal part in the clinical picture of the *expansive form* (classic) is played by the delusion of grandeur and wealth. The delusion is characterized by its absurdity. The behaviour of the patients is entirely at variance with their statements. For example, a patient asserted he had carloads of gold and at the same time tried to collect the leavings in the dining-room. The patients exhibit euphoria, appear completely happy and carefree, often put on special clothes and hang pieces of tin and paper on the breast, claiming them to be decorations (Fif. 53). One patient believed himself a great general, another (former engineer) claimed he was a mother-heroine. The following case history is illustrative.

Patient C., 37 years old, was admitted to the clinic in 1953. He grew and developed normally. After graduation from secondary school was drafted for military service and fought in the last war. He was sociable, good-humoured, energetic and fond of a drink.

The patient had first attracted attention to himself by his strange behav-

iour in the spring of 1953 when he began to call himself Chief Marshal and to assert that he was the head of all the air forces. Was hospitalized, but continued to voice ideas of grandeur, saying he was the "maker of world victory" and claiming to have hundreds of decorations. He claimed to be the leader of several revolutions in various countries of the world where

Fig. 53. Self-made identity certificate of a patient with delusion of graundeur.

Staff of Heavy Machine-Gun Division
Partizan Passport

Left: Melnikov, Gleb Yakovlevich, is three times Hero of the World, and has the right to wear all corresponding medals, badges and decorations and all bright objects on the right and left breast. He has first priority for issue of uniform and clothing.
Partizan pseudonym: Dubinin, Gleb Yakovlevich, "Chapayevite".
(Signed and sealed)

Right: Three times Hero of the World
Melnikov, Gleb Abramovich

his relatives were now heads of governments and all their actions were carried out according to his instructions. He believed he was a member of governments of all the countries the world over. Believed all his viscera—stomach, heart, lungs, etc.—had been burned before admission to the hospital. In connection with this he planned to take treatment from a military physician of imperial origin. Asserted he had been given a new head, his real head being embalmed and in keeping of the attending physician, etc.

Physical Condition. No marked changes in the heart, lungs or abdominal organs.

Neurologic Symptoms. Anisocoria, the pupils do not react to light, but react to convergence and accommodation. Slight asymmetry of the face, the patient puts out his tongue jerkily. Irregular patellar and Achilles tendon reflexes. Light swaying in Romberg's test.

Analysis of Cerebrospinal Fluid. Wassermann test ****, cytosis 21/3, protein 0.5‰. Lange's test 666,442,100.

The cases in which dementia combined with complacency comes to the foreground in the picture of the disease are referred to as *the demential form* of general paresis.

In *the depressive form* the patients are dejected. They have incongruous delusions, say that their internal organs have all rotted away and that they are already dead. They often castigate themselves, insist that they are wicked and claim to have ruined thier families and to be the cause of general destruction. The depressive form is observed rather rarely.

Excitement predominates in the clinical picture of *the agitated form.* It is difficult to keep the patients in bed because they jump up, tear off their underwear and try to run away. Among their utterances ideas of grandeur can sometimes be distinguished. As a rule, they refuse food or swallow it without chewing. This is the most malignant form of the disease.

If the patient is not treated, all forms of general paresis sooner or later result in mental and physical degradation which may reach its extreme state—marasmus.

Stage of Marasmus. Upon the onset of this stage the patients lose even the simplest skills; in virtue of extreme emaciation and debility they are forced to stay in bed, become slovenly, and often develop various pareses and paralyses. The prolonged confinement to bed and trophic disturbances give rise to contractures, bedsores and bone fractures. Dementia reaches the point where the patients cannot tell their names and cram their mouths with anything that falls into their hands. In this stage the patients usually succumb to apoplexy or accidental diseases to which they are easy prey.

Neurologic Symptoms. Speech disorders constitute one of the rather early signs of general paresis. In conversation with a patient it can be observed that he finds it difficult to pronounce complex words or say something rapidly.

The pupils are often narrow and of unequal diameter (anisocoria). As a rule, they do not react to light, but retain the accommodation reflex. This is known as the Argyll-Robertson pupil sign. These signs are very important for timely identification of general paresis.

In general paresis sensitivity is diminished, and any scratches or abrasions therefore escape the patients' notice. The patients' handwriting changes, the letters and lines become uneven.

Serology Reactions. Wassermann test of the spinal fluid and blood is, as a rule, positive. Lange's test (with colloidal gold) is very important for the diagnosis of general paresis.

Pathologic Anatomy. General paresis has a characteristic

pathoanatomical picture. The meninges thicken and adhere to the cerebral matter. Separation of the meninges from the brain tears away pieces of the cerebral substance. The vessels are sclerotic. Examination of the surface of the brain shows the convolutions to be smoothed out and the fissures widened. The cerebral ventricles are also expanded, which indicates internal dropsy. The weight of the brain diminishes (Fig. 54). Microscopic examination of the brain reveals specific chronic diffuse leptomeningoencephalitis.

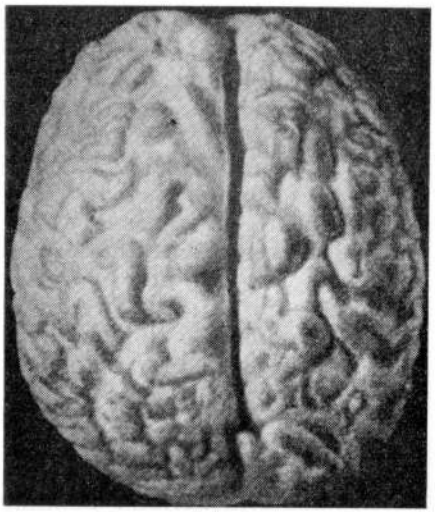

Fig. 54. Thickening of the pia mater and cerebral atrophy in general paresis

Etiology. Until the beginning of the 20th century the connection between general paresis and syphilis was a debatable question. The inseparable connection between general paresis and syphilis became evident when it turned out that in general paresis Wassermann test is always positive. The question was finally settled when the Japanese bacteriologist Hideyo Noguchi found the *Treponema pallidum* in the brain (1913).

Prophylaxis. Since general paresis is a syphilitic disease, its prevention naturally consists in elimination of syphilis and thorough treatment of the incipient stages of the disease.

Treatment. In general paresis specific treatment does not alone produce the desirable therapeutic effect. The disease was considered incurable until the discovery of the method of infective therapy. A. Rozenblum, a physician from Odessa, was the first to elaborate this method of treatment in the 1870's. Having observed that general paresis patients who had contracted relapsing fever began to recover he purposely infected such patients with relapsing fever. Later Wagner-Jauregg began to treat patients on this principle, using inoculation of tertian malaria. Infection with rat-bite fever (sodoku) is also used for the same purpose.

The most widespread method of treatment today is that with malaria. The patients are allowed to have an average of 9-10

attacks; then the attacks of malaria are arrested by administration of quinine, following which the patients are given specific treatment.

The effectiveness of the treatment depends on how timely it is instituted. The sooner malaria or relapsing fever is inoculated, the more effective is the treatment.

In quite a number of cases the treatment enables the patients to return to their usual work. There are reasons to believe that in this form of therapy the good therapeutic results are due not only to the elevation of temperature (methods of hyperthermia do not produce such therapeutic effects), but also to the immunobiologic changes produced by these diseases.

Positive therapeutic effects are observed even when infection involves no perceptible rise in temperature.

Care. Nursing excited and physically debilitated patients is fraught with considerable difficulties. If retention of urine is observed and catheterization is required, the latter must be performed with extreme caution. It should be remembered that general paresis patients have low sensitivity and are easy prey to infection. Bedridden patients must be carefully watched so that they develop no bedsores. It is therefore important to rub down the patients' skin with spirit of camphor in due time and to keep the patients clean.

While nursing these patients it must be remembered that many of them have marked trophic changes which are sometimes manifested in excessive fragility of their bones. Turning the patients over in bed may result in fractures, the ribs being fractured particularly easily. If a course of treatment with malaria is prescribed the patients' temperature and cardiovascular system must be carefully watched and all measures required in severe infectious cases must be carried out. When feeding patients it must be remembered that they have difficulties in swallowing and that the food may gain entrance into the larynx.

MENTAL DISORDERS IN VASCULAR DISEASES OF THE BRAIN AND IN HYPERTENSIVE VASCULAR DISEASE

Cerebral Arteriosclerosis (Arteriosclerosis Cerebri)

The essence of the pathologic process consists in changes in the vessels which supply the brain—the vessels become narrow and their coats thicken (become sclerotic). This impairs the nutrition of the cerebral cells and their supply with oxy-

gen, and thus leads to disorders of the cerebral functions. The pathologically affected vessels may rupture or become totally occluded. In such cases rather large foci of cerebral hemorrhages arise or areas of cerebral malacia develop. According to Anichkov's generally accepted conception, the pathologic process leading to arteriosclerosis is based on disturbances in lipoid metabolism. Excessively accumulating in the organism lipoid (fatlike) substances, cholesterol in particular, are deposited on the innermost coat of arteries, which leads to reactive proliferation of connective tissue in the vascular wall.

Cerebral arteriosclerosis most commonly develops in persons 50-60 years of age. An important part in the development of this affliction is played by various harmful factors and diseases survived by the patient—typhus, head trauma, psychic traumas, long-continued emotional stress, abuse of cholesterol-containing food (large amounts of cholesterol are found in eggs, brains, kidneys, liver) and excessive smoking.

Symptoms. Headaches, dizziness, tinnitus cranii and a feeling of heaviness in the head are the early signs of the disease.

The symptoms include irritability, emotional instability and rapid tiring of mental work. Sleep is disturbed, the patients finding it particularly difficult to fall asleep. Simultaneously there are initial signs of memory disturbances—forgetfulness and absent-mindedness. The memory weakens mainly for very recent and current events—new names and facts recently read or seen are difficult to remember. All this leads to diminished working capacity; to do a piece of work which formerly offered no difficulties, now requires a good deal of effort and a lot of time. It is particularly difficult to learn new, unfamiliar material. Aware of the morbid changes taking place, the patients often develop protracted depressive states and sometimes suicidal thoughts and attempts.

These changes in their emotional life further aggravate the patients' condition.

All the aforementioned signs are initial manifestations of cerebral arteriosclerosis. Sometimes many of these symptoms may disappear after a long period of rest even without treatment.

It has also been observed that all these symptoms periodically intensify or subside. The disease may persist at this stage with periodic aggravations and remissions for a long time (many months and even years), but, if no therapeutic measures are taken and the harmful factors are not eliminated, the disease will slowly advance.

In course of time the memory disorders increase and the

working capacity continuously diminishes. Difficulties in combinatorial thinking and comprehension appear. The patients' emotional instability increases: on hearing solemn music, meeting relatives, etc., they readily burst into tears. A picture of rather marked dementia gradually develops, a considerable part in the structure of the dementia belonging to disturbances in memory and comprehension. In spite of this the patients are aware of their disease.

Upon addition of organic neurologic symptoms dementia assumes the most strongly pronounced character; the patients become slovenly, complaisant, and their invalidity no longer oppresses them. Sometimes they grow selfish and callous and concentrate their attention on gratifying their basest desires. If the patients suffer apoplectic strokes, the latter considerably accelerate the decline in mental activity. In course of time signs of physical emaciation appear. Such patients require continuous nursing for they are unable to take care of themselves. Some cases terminate in a severe arteriosclerotic marasmus ; as a result of stable paralyses or pareses the patients are totally demented and helpless; they have to be fed from a spoon and their beds must be watched because they urinate and defecate involuntarily. They easily develop bedsores, congestive pneumonias, etc.

Since arteriosclerosis is a general disease of the organism, it usually involves the aorta, coronary vessels, renal vessels, etc.

Pathological Anatomy. Autopsy of arteriosclerotics reveals local areas of atrophy in the cerebral cortex and rather large foci of cerebromalacia, sometimes with formation of fluid-filled cavities (cysts). Examination of large cerebral vessels, especially those at the base of the brain, often shows coarse sclerotic changes; upon incision of a vessel its walls do not collapse, the vessel is hard and sometimes crepitates when opened by a scissors, which attests induration of the vascular wall with deposition of calcium salts. Areas of malacia or hemorrhage may be observed not only in the cortex, but also in subcortical structures, particularly the brain stem. Microscopic examination of the brain reveals large foci of obliterated nerve cells arranged mainly about the vessels. The vascular walls are considerably thickened, sometimes to the point of complete occlusion of the vessels. Necrotic changes in the vascular walls may often be observed. Proliferation of the neuroglia can be seen at the sites of destruction of nerve cells. The nerve cells are loaded with lipofuscin, large amounts of which are also found on vascular walls.

Treatment. The most important part of the treatment on ap-

pearance of the first, initial signs of the disease consists in a number of hygienic measures—prevention of overwork, a strict regimen and regulation of sleep; the latter includes a walk one hour before sleep and warm foot baths 10-15 minutes before sleep. Anything in the diet that contributes to development of arteriosclerosis must be sharply reduced. The diet must consist mainly of vegetables and dairy foods*.

Smoking must be given up. Good results can undoubtedly be achieved by carrying out these measures persistently and systematically. The following medicinal preparations are recommended during this period: iodides (1 tablespoonful of a 3 per cent potassium iodide solution 2-3 times a day), infusion of a glucose solution, ascorbic and nicotinic acids, and magnesium sulfate; physiotherapy—carbon dioxide baths, ionization of the head with iodine by Bourgignon's method—is indicated (for measures to be taken in cases of apoplexy see chapter on disturbances in cerebral circulation).

Hypertensive Vascular Disease (Morbus Hypertonicus)

Patients with hypertensive vascular disease are treated by internists and neuropathologists, but various mental disturbances may be observed in the course of this disease.

Symptoms. The main complaints are headaches, dizziness, tinnitus, tachycardia, dyspnea, irritability, rapid tiring, and rushes of heat to the head and face. All these manifestations are characteristic of the initial stage of the disease.

The more protracted the disease, the more commonly it is accompanied by sclerotic changes in the cerebral vessels and is thereby naturally aggravated. Whereas cerebral arteriosclerosis predominantly affects the large cerebral vessels, hypertensive vascular disease involves mainly the small arteries (arterioles). These cases are referred to as arteriosclerosis associated with hypertension. The development of the aforesaid changes in the cerebral vessels marks the sclerotic stage of hypertensive vascular disease. This period is characterized by memory disorders, diminished working capacity and sleep disturbances. Periodically the patients may have attacks of fear and anxiety;

* Foods, rich in cholesterol—egg yolk, caviar, fat beef, mutton, or pork, brains, liver, sprats—should be greatly restricted. It is advisable to have fasting days using only fruit, cottage cheese, etc. The diet should include kefir, sour milk, cottage cheese, egg white, vegetables, beans, porridge, boiled meat, cod. The intake of liquid should be limited to 1.5 litres a day. Bowel movements should be strictly watched. Seaweeds (*Laminaria saccharina*), purgatives, and cleansing enemas are helpful to prevent constipation.

consciousness disorders, most commonly of the type of the twilight state, sometimes develop and delusional syndromes appear. In such cases the patients are gripped with fear, have hallucinations, often behave improperly, sometimes leave home and walk about aimlessly; on coming to their senses they do not remember anything. It is also important that in hypertension most psychoneurotic disturbances are of a fluctuating character, i.e., aggravations alternate with improvements in the patients' condition, which is associated with variations in the blood pressure and changes in vascular tone. Such patients are frequently said to have "flickering" symptoms.

The treatment must necessarily be conducted both by an internist and a neuropathologist.

During the first stage of the disease it is very important to observe a strict regimen and eliminate all emotional stress. It is necessary to adjust the patients' sleep, keep them outdoors as much as possible, watch the functioning of their intestines and periodically measure their blood pressure. Psychotherapy is very helpful during this period. Diuretin, magnesium sulfate, intravenous infusions of a 40 per cent glucose solution, and serpasil (reserpine) are widely used to reduce the blood pressure. The diet must consist mainly of vegetables and dairy foods. No strong coffee or tea must be allowed. Physiotherapy—general warm baths and hot foot baths—is recommended.

Bloodletting (up to 300 ml), leeches (3 behind each ear), hot foot baths (10-15 minutes) for the night and bedrest for several days are indicated in cases of a sharp rise in blood pressure (for aid in cases of apoplexy see chapter on disturbances in cerebral circulation). The treatment of patients in the sclerotic stage for the most part coincides with that of cerebral arteriosclerosis. In the event of development of a psychotic state the patients require careful supervision and nursing (special attendants must be assigned).

To arrest excitement and prevent cerebral hemorrhage requires bloodletting; amytal sodium is administered in suppositories or in enemas (0.4 g). Hypertensive vascular disease is now effectively treated with reserpine, propaesin (paraminobenzoic acid propyl ester) and aminazine.

PSYCHOSES ASSOCIATED WITH AGE CHANGES IN THE ORGANISM (INVOLUTIONAL PSYCHOTIC REACTIONS)

Some mental diseases occur in old age. The clinical picture of these psychoses is directly dependent on the changes taking place in the organism in connection with age. These changes

include primarily the reorganization of metabolism and the diminution in the function of the gonads. The latter always leads to disturbances in the endocrine balance. During this period the patients exhibit vasomotor disturbances manifested in rushes of blood to the head and face, and not infrequently elevated blood pressure.

The process of decline of the organism—involution—may last quite long. It is therefore customary to divide it into two periods: the first—presenility (preceding old age)—from 45 to 60, and senility (old age)—past 60 years of age. Hence the division of involutional psychotic reactions into presenile and senile.

Presenile Psychotic Reactions

As V. Gilyarovsky points out, psychotic reactions are referred to as presenile when the main symptoms of the disease are connected with phenomena of involution. The leading part in the clinical picture of the psychotic reaction is played by anxiety. The patients are anxiously apprehensive and speak about their own death and that of their relatives. Sometimes they maintain that they are to blame for the impending ruin of their family and await punishment and reprisal. Various forms of presenile psychotic reactions are distinguished according to the symptoms predominating in the clinical picture. The main forms are presenile depression and presenile paranoia, less frequently—presenile hysteria.

Presenile Depression. The beginning of the disease may vary. In some cases it develops gradually, within several months, in others—acutely. The acute onset is most commonly precipitated by some definite circumstances (psychic trauma or a somatic disease). The picture of the disease consists of dejection, anxiety and motor excitement. These symptoms are not infrequently combined with ideas of wickedness and guilt. The patients nearly always have disturbed sleep. They are uneasy, anxious and fearful; they often refuse treatment and sometimes food under the pretext that they have no stomach, intestines, etc., but even when they do eat they lose considerable weight. As a rule, such patients look older than they are. They have a flabby skin and turn grey early. They are continuously afraid that some people may come to torture or shoot them. Sometimes they believe they will be arrested because all their viscera are rotting and they are thereby infecting everybody around.

Some patients maintain they have no home any more, all their relatives have died, the world is going to ruin and they

are to blame for it all. Such patients often harbour suicidal ideas which they sometimes carry into effect when least expected. There were cases in which before committing suicide, the patients killed their relatives, because they believed the latter had to die anyway and "most likely in terrible torture". In view of this such patients must be immediately placed in a mental hospital.

It is often difficult to draw a line between the aforedescribed state and the depressive phase of the manic-depressive reaction.

Presenile depression may last many months, less frequently —years. In cases of concurrent cerebral arteriosclerosis the disease leaves a certain intellectual and emotional defect.

Presenile Paranoia. The clinical picture of this disease is characterized mainly by various delusions whose development is precipitated by certain circumstances—trouble at work, at home, etc.

The patients begin to feel that their associates now treat them differently and see a concealed meaning in everything.

In presenile paranoia delusions do not usually extend beyond the possible. They are often associated precisely with the people with whom the patient had some sort of conflict. They are sometimes influenced by various unpleasant sensations occurring in the patient's body. In connection with the diminished function of their gonads the delusions often take on a sexual colouring. Ideas of jealousy develop. The patients begin to watch the mail in the hope of intercepting a love letter and regard the visits of friends with suspicion. In a number of cases, owing to the auditory hallucinations which often accompany this disease, the patients find confirmation of the "correctness" of their delusional ideas. Presenile paranoia always lasts longer than presenile depression; its prognosis is therefore less favourable.

Treatment. In presenile psychotic reactions general roborant therapy must be combined with administration of endocrine preparations (1 ml of folliculin or testosterone intramuscularly, or 0.02 g of synestrol [dihydrostilbestrol, hexanestrol, hexoestrolum] 2-3 times a day). Subcutaneous oxygen insufflation, small doses of insulin and electroshock therapy are effectively used in cases of depression. Hypnotics are recommended for insomnia. In cases of great excitement, melancholy, delusions and sleep disturbancy—200-400 mg of aminazine daily per os or intramuscularly. Of late, iprazid (or marcilid) in a daily dose of 150-200 mg, and aminazine in combination with melipramine are used in the treatment of depressive states.

Electroshock therapy (3-4 sessions) may prove to be effective.

Care. The patients must be carefully watched because presenile psychotic reactions involve ideas of suicide, as well as motor excitement combined with melancholy and anxiety. The patients' somatic condition and diet must also be watched. If a patient persistently refuses food he must be fed artificially.

Senile Psychotic Reactions

Senile psychotic reactions are accompanied by primary atrophy of nerve cells of the cerebral cortex, owing to which the patients become increasingly more feeble-minded. Senile psychotic reactions are most commonly observed at 60-80 years of age.

The memory is the first to weaken upon the onset of the disease, the patients scarcely being able to learn anything new. They begin to forget all they ever knew and especially what they have learned in the last years of their life. As the memory disturbances increase, they forget the names of their friends and even close relatives, they also forget where they put things. They are often aimlessly fussy. In some patients memory is so impaired that they totally forget the events of recent years (sometimes many years); asked what they have been doing they relate what they did when they were young or many years ago. It should be noted that they often remember the main events of the remote past and the dates of these events rather well. Sometimes they substitute recollections of long ago for current events. For example, asked what she did in the morning an 82-year-old patient said she drove to church in a horse-drawn carriage, visited friends and danced to phonograph music. It was 1954, but she thought the year was 1905.

Such patients often confabulate, i.e., tell about events which actually never occurred. The mental faculties of these patients weaken so much that they cease to orient themselves in their surroundings. They cannot solve the simplest problem and confuse everything. A certain patient believed his own son to be 5 years older than himself. The patients are entirely unaware of their condition. They often take offence when told about the lapses in their memory (Fig. 55).

The patients may be in low spirits, in which case they voice correspondingly gloomy thoughts, or complacently goodhumoured. In the latter case they sing and dance without the least embarrassment. They often have sleep disturbances, and wander through the rooms to make sure the doors and windows

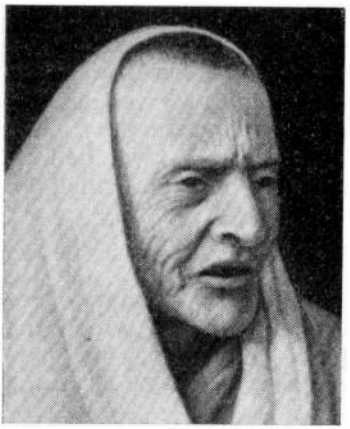

Fig. 55. Countenance of patient with senile psychosis

are locked because they are frequently afraid of burglars. After a sleepless night they are excessively drowsy during the day and may fall asleep during conversation or while taking a meal.

The patients are particularly afraid of being robbed. They hide their personal effects and sometimes even take them to their friends because they have a feeling that the members of their families also steal their things. Since their memory is considerably impaired they keep forgetting where they hid their things, which serves as proof that they were robbed. They often maintain that they may starve to death because they have no means of subsistence; they also complain of various losses and in some cases begin to collect useless things, for example, rags, boxes, bottles, etc. In the hospital such patients sometimes bundle up their bedding and hold on to it with both arms continuously complaining that they are about to be robbed. They neglect their appearance and become slovenly and untidy. Many of them have a good and at times excessive appetite and greedily eat all the food they are given. In far advanced cases the patients forget how to use a spoon and fork. They are not concerned about the fate of their friends and relatives, all their interests being aimed at satisfying their elementary needs.

Hypochondriacal patients may assert that all their viscera—stomach, intestines, etc.—have rotted away.

Pathologic Anatomy. The pathoanatomic picture is characterized mainly by atrophy of the cortex, the frontal and temporal lobes being affected the most. The brain of the patients weighs 100-150 g less than that of healthy old people.

Treatment. Symptomatic agents are administered and considerable attention is devoted to nursing the patients. Hypnotics are recommended in cases of insomnia. Iodides and bromides are helpful. Since the patients are given warm baths, it is necessary to devote greater attention to their cardiovascular function. Hospitalization is advisable.

EPILEPSY

Epilepsia is a Greek term meaning "sudden fall" or "sudden seizure".

It was considered a disease entity by Hippocrates as early as the 5th-4th centuries B.C. Various authors distinguish two groups of epilepsy—*symptomatic* and *genuine*.

If the epileptiform seizures are symptoms of some other disease, they are regarded as symptomatic epilepsy. Epileptiform seizures occur, for example, in such diseases as neurosyphilis, cerebral arteriosclerosis, cerebral tumour, trauma, etc., whereas genuine epilepsy is a disease based on metabolic disturbances.

Symptoms. The clinical picture of the disease varies rather widely. All manifestations observed in epilepsy may be divided into four groups, namely, seizures, consciousness disorders, mood disorders and epileptic changes in the personality with a characteristic degradation in intellect.

An epileptic seizure usually occurs suddenly and without any apparent reason. The patient loses consciousness and falls. The fall is the result of a sharp tonic tension of all the muscles of the body. However, since the tension is unevenly distributed over the muscles, the patient most frequently falls forward and sideward, less frequently—backward. A characteristic cry is sometimes heard during the fall. The patient develops tonic spasm—the arms and legs are extended in a state of sharp muscular tension; the muscles of the trunk are similarly tense. Within 20-40 seconds the tonic spasm is replaced by clonic spasm, which is manifested in rhythmic contractions of the muscles of the extremities. The face pales and then becomes cyanotic. The pupils are dilated and the reaction to light is absent. The tendon reflexes cannot be evoked. The patient does not react to the strongest stimuli. There is a frothing at the mouth often stained with blood since the patient usually bites his tongue or the internal surface of the cheeks. The seizure is frequently accompanied by incontinence of urine, less frequently—defecation. The clonic spasm is followed by muscular relaxation. The patient's consciousness remains deeply clouded. The seizure lasts not more than 4-5 minutes and is often followed by sleep.

In some patients the seizures occur more frequently during the day, in others—at night. The frequency of the seizures varies very widely; they may occur daily, once a week, once a month, and even less frequently. In some cases the seizures follow each other for several hours on end. The intervals be-

tween the seizures may be so short that the patients fail to regain consciousness. This is known as *an epileptic state* (status epilepticus). In such cases it is necessary to take urgent measures because this state may end lethally.

Some patients can predict a seizure 1 or 2 days ahead of time. They begin to feel indisposed, are generally weak and in low spirits. In a considerably greater number of patients the seizures begin with an *aura* (breeze) which lasts but a few seconds. The manifestations of aurae vary very widely. The following aurae are distinguished: *vegetative aura* during which the patient perspires, pales, turns red, has a sensation of dryness in the mouth, etc.; *sensory aura*—manifested in unpleasant sensations in various parts of the body or hallucinations; the hallucinations are most commonly visual, the patients seeing sparks, a bright light, etc.; *motor aura* in which case the patients run in the beginning of the seizure, swing their arms, perform inexplicable movements, etc.; *psychic aura*—the patients not infrequently experience fear or special states of bliss with "everything seeming simple and clear". The seizures are nearly always followed by amnesia, the patients remembering absolutely nothing.

For some time immediately following the seizure many patients exhibit so-called amnesic aphasia, i.e., they cannot remember the names of a number of objects, although they know what these objects are for. This period is also characterized by several more symptoms which warrant the conclusion that the seizure was genuinely epileptic. For example, examination of the flexor surfaces of the arms in the region of the elbow joints and of the sclera often reveals petechial hemorrhages. The blood exhibits leukocytosis. Urinalysis shows protein in the urine. Pathological reflexes (Babinski's sign, Oppenheim's reflex, etc.) are sometimes observed. Since the epileptic seizure occurs suddenly and under any circumstances, it may result in severe injuries (Fig. 56). For example, a patient had a seizure near a tank in which she was boiling linens, with the result that she scalded her arms.

Fig. 56. Scalped wound in occipital region of epileptic

In addition to major epileptic attacks there are also minor attacks (petit mal). The petit mal seizure lasts but a few seconds. The patients do not fall and have no convulsions, as is the case in major (grand mal) attacks. Only fibrillary twitchings of various muscles are observed. Sometimes the patients behave strangely during seizures—they spin in one place and do incongruous things.

Epileptic Disorders of Consciousness. A short disorder of consciousness known as *absence* in which the patient briefly (for a few seconds) loses consciousness is one of the forms of these disorders. For example, during work or conversation the patient becomes frozen still, staring at one point; then he goes on as if nothing happened. Usually the patients themselves fail to notice this state. Nor can those around them always notice it.

The twilight state is a longer consciousness disorder. It may last from a few minutes to several hours and longer. The behaviour of the patients during this period is determined by the morbid experiences which they have at this time. For example, the twilight state is not infrequently accompanied by hallucinations. The patients sometimes see frightful pictures and act accordingly—they hide, take to flight, attack those around them, etc. While in this state the patients sometimes commit crimes (murder, destruction of property). Such patients are therefore sometimes subjected to examination by alienists. For example, a certain epileptic patient locked herself with her 2-year-old child in her apartment. Her twilight state lasted several hours, and when it terminated she could not find her child. She reported it to the police. Soon parts of her child's burned bones were found in her stove.

All offences committed in the twilight state are usually characterized by incongruity and cruelty. The patients who have committed them make no attempt to escape. In nearly all cases the twilight state is followed by total amnesia, the patients being unable to tell anything concerning their behaviour.

The twilight consciousness changes also include the state of *trance.* This state also occurs suddenly and may last several days or even weeks. In this state the patients may not attract any particular attention. They may travel from one end of the town to the other, etc. Those who had experienced such states related how they had travelled in a direction they had not intended to or had made long trips. One patient who lived in Moscow lapsed into a trance on his way home from work. When he regained consciousness he was unable to recognize the street in which he happened to be at the time, and he began to ask passers-by to direct him to a certain Moscow square.

As a result he discovered that he was not in Moscow but in Leningrad. It was subsequently established that he had lapsed into a trance, had gone to the Leningrad railway terminal, had bought a ticket and departed attracting no attention at all. This state lasted about 24 hours. The patient had no idea of what had happened to him and how he had ever got to Leningrad.

When such patients meet their relatives or friends the latter sometimes notice the unusual expression on the patients' face and certain other changes. The patients are usually silent or fail to answer question to the point. The reaction of the pupils to light may be altered; pathologic reflexes are sometimes observed. In the event a patient lapses into a trance during work, he often finishes his work, but is then unable to tell what he did.

Mood disorders (dysphoria) in epilepsy may manifest themselves in sudden melancholy, anger, and less frequently—gaiety. These states both appear and disappear suddenly and may last from a few hours to several days. In cases of depression it is not melancholy but irritability that predominates. The patients become captious and malicious. They pester those around them with petty requests and complaints, and may be aggressive. Unaccountable fears sometimes play an important part in the patients' dejection.

In epilepsy *the changes in the personality* (personality disorganization) and intellect develop slowly. They increase faster if the patients have frequent convulsive seizures. It should be noted that the tendency to personality changes differs in the different patients.

Some epileptic patients retain great intellectual abilities to a very old age.

In cases of marked personality changes the patients cannot state their ideas briefly. They dwell on unnecessary details and cannot separate the main things from those of secondary importance. It is always difficult to listen to such patients and to switch them from one topic to another. They develop a tendency to use diminutives, become uncommonly courteous, sugary in address, ready to play humble, effusively thankful for each trifle and continuously begging pardon. They are ready to humiliate themselves on the least occasion. At the same time they exhibit contrary traits—cruelty, selfishness, malice and aggressiveness. A combination of contrary traits of character is the chief characteristic of the epileptic's personality. The patients are pedantically neat, and often make a row if anybody has changed the order of their things. They are very ran-

corous and nurse grudges for a long time. They may nurture plans of revenge for years.

As a rule, the patients' memory is impaired. They find it particularly difficult to learn anything new. They are uncommonly thorough and neat in their work (Fig. 57). If a patient has been prescribed a medicine, he makes sure to receive it in due time and is irritated by any hitch in its administration. The patients often pose as champions of justice. In connection with this they find fault with those around them, hold themselves up as examples, etc. The patients' movements often become slow or angular. The following case history may serve as an illustration.

Patient N., male, 22 years old, was admitted to the clinic in 1953. He was the first child in his family and grew and developed normally. Was even-tempered and sociable. He enrolled in school at the age of 8 and after 8 years of schooling had started working as fitter. The first seizures with loss of consciousness occurred in 1948. Since then the seizures recurred periodically, once a month. Sometimes the seizures occurred in series—10-12 in the course of a night. Before seizures he had a peculiar sensation to which he referred as follows: "I feel a heaviness in the head and at the same time smell a heavy, pleasant odour which resembles the letter F. After that I

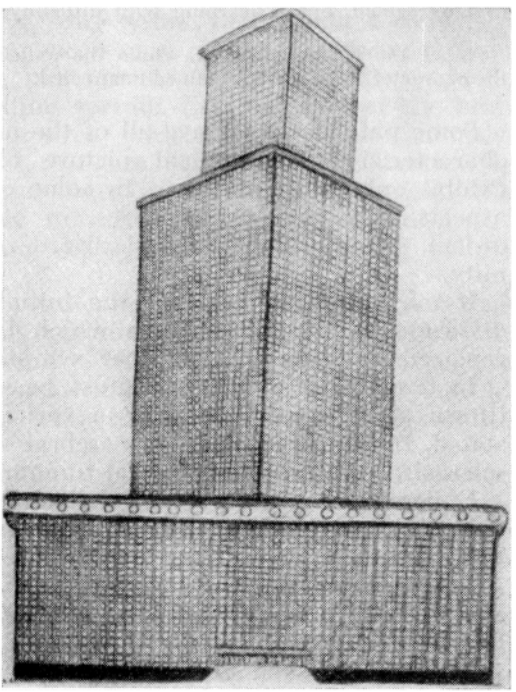

Fig. 57. Painstaking finish of drawing by epileptic

remember nothing else". The patient knew from those around him that he had convulsions and incontinence of urine.

The patient's memory gradually began to weaken, and he could no longer attend school. Before admission to the clinic he had been treated as an outpatient; the seizures had become less frequent, but had not completely ceased.

Physical Condition. No visible pathologic changes.

Neurologic Symptoms. Slight asymmetry of the face.

Mental Condition. The patient readily makes contact with the physician and talks about himself. He speaks slowly, with a drawl, monotonously, in a singsong manner, and sometimes finds it difficult in choose the right word. The movements of his face are poor and inexpressive; his general movements are angular and slow. Often answers questions in unnecessarily great and unessential detail. Relating the story of his fight (while already ill) in which he was hit over the head with a belt he dwells on unnecessary details: "It was a belt I was hit with, that is a belt buckle; the belt buckle was in the middle, you know. It was a beautiful belt buckle.... One of those belt buckles sailors wear, you know; those large and beautiful ones.... Well, he started swinging that belt.... We all decided to run... but I had my back turned on him, and at that moment he hit me on the back of the head.... I mean right about here, you know, the back of my head."

The patient's memory is impaired. He is extremely prompt and pedantic. Carefully keeps notes of all the physician's prescriptions and advice in a special book and keeps a special diary of his general condition. Since the onset of the disease his character has changed; he has become unsociable, morose, the range of his interests has diminished. Is diligently attending evening school, but is learning with difficulty despite his assiduity and accuracy.

Since the treatment in the clinic the patient's seizures have ceased, but the character traits have remained unaffected.

Some patients may have all of the aforementioned symptoms characterizing the clinical picture of epilepsy, others may exhibit only some of them. In some cases the leading clinical aspects are convulsive seizures, in others—consciousness disorders, in still others—mood disorders or changes in personality.

It may also happen that the initial clinical aspects of the disease are epileptic seizures which later disappear and are replaced by some of the other symptoms mentioned above.

In diagnosing epilepsy it must be remembered that epileptiform seizures may be due to various causes. As previously stated, they may develop in cerebral syphilis, cerebral arteriosclerosis, head trauma, cerebral tumour, and other diseases.

Epileptiform attacks very readily occur in childhood. Sometimes they develop in cases of acute infection and intoxication. The attacks may also be due to infestation with helminths. After corresponding treatment the attacks cease. All this must be carefully considered when epilepsy is diagnosed in childhood. Phenomena known as somnambulism (sleep walking) are sometimes observed in children and youths. Some authors are

inclined to regard somnambulism as a manifestation of epilepsy, but according to the latest data somnambulism is not always associated with this disease; it is often a manifestation of sleep disturbances.

It is necessary to know the differences between epileptic and hysteric attacks. Usually the duration of an epileptic attack does not exceed 5 minutes, whereas an attack of hysteria may last for hours. In an epileptic seizure the pupils do not react to light, in hysteria the reaction of the pupils is retained. In a fit of hysteria the patient never sustains such severe injuries as in epilepsy. Lastly, it is necessary to consider the symptoms observed after an epileptic seizure. These symptoms must be particularly borne in mind since the seizure may not always be observed because of its short duration.

Pathologic Physiology of Epilepsy. The mechanism of onset of a convulsive seizure and other epileptic disorders is not completely known as yet. There are various points of view concerning this mechanism.

As was already mentioned, considerable importance in the onset of the disease is attached to metabolic disturbances. Toxic products accumulating in the human organism poison the brain. In response to this the nervous system reacts with a convulsive discharge. This may be conceived as follows: a focus of excitation forming in some part of the brain gradually expands. Subsequently this excitation spreads (irradiates) over the brain and extends to its motor area, which leads to the convulsive seizure. The character of the aura depends on the part of the brain in which the initial focus of excitation has arisen (the particular analyser). For example, with the focus in the occipital lobe the aura may be accompanied by visual hallucinations.

According to I. Pavlov, epileptic patients exhibit a pathologic inertness of the nervous processes. Excitation and inhibition alternate with great difficulty. In addition, both excitation and inhibition may reach considerable intensity. Many of the epileptic patients' character traits are due to the inertness of the nervous processes.

Pathologic Anatomy. The greatest pathoanatomical changes occurring in epilepsy are observed in those parts of the brain which have an inferior blood supply; these include primarily the hippocampus (horn of Ammon). Macroscopically it is observed to shrink. Microscopic examination of the brain reveals destruction of neural elements and sharp proliferation of neuroglia. The proliferation of neuroglia in the superficial layers of the brain produces so-called marginal gliosis. Changes are

often observed in the cerebellum. A swelling, cerebral edema and petechial hemorrhages are always found in patients who died in an epileptic state.

Treatment. Luminal is the most widely used drug and should be prescribed together with bromides. The usual prescription is 0.1 g of luminal for the night and 1 tablespoonful of a 5 per cent sodium bromide solution twice a day. If ingestion of bromides gives rise to acne vulgaris the following mixture is additionally prescribed:

Rp. Liq. arsenicalis Fovleri 3.0
T-ra Absinthii 15.0
MDS. 5 drops b.i.d.

In course of time the luminal-bromide ratio is altered depending on the changes observed in the patient. It is very important to find the dose which arrests the attacks. On the whole the course of treatment lasts close to 1 year. Chloracon (benzchloropropamide) benzonal and phrenacon are also used.

Moreover, the treatment of epilepsy includes administration of dilantin sodium (0.1 g 3 times a day) which is usually prescribed together with luminal. The course of dilantin sodium treatment is 3 weeks. Sometimes the methods of Y. Karmanova or M. Sereisky are used*.

Epilepsy has of late been effectively treated with hexamidine (1.3-dioxy-5-ethyl-phenyl-hexapyrimidine) and maisoline (5-ethylhexahydro-5-phenylpyrimidine-4,6-dione). In the beginning a dose of 0.1 g once a day is prescribed; subsequently the dose is increased to 0.25-0.5 g 2-3 times a day.

Petit mal attacks are successfully treated with trimethin (trimethadione)—0.1-0.2 g 3 times a day. In cases of prolonged administration of this drug it is necessary carefully to watch the blood formula. In some cases glutamic acid and magnesium sulfate are injected intramuscularly, as well as librium (chlordiazepoxide).

Urgent measures are required for patients developing an epileptic state. Either 2-3 g of chloral hydrate in an enema or a 10 per cent sodium bromide solution (10 ml) intravenously, or a 10 per cent hexenal solution intramuscularly is recommended. If these measures prove ineffective anesthesia is applied. In some cases a lumbar puncture is resorted to. The patient's

* The course of treatment by Y. Karmanova's method includes administration (according to a certain scheme) of pills and a mixture containing various anticonvulsants and narcotics. M. Sereisky has suggested a mixture containing anticonvulsants and diuretics.

heart action and respiration must be carefully watched. Cordiamine, glucose and in some cases mercusal (mersalyl) are prescribed.

During the treatment of epilepsy the patients are advised a dairy and vegetable diet. Consumption of common salt and fluid is curtailed.

Alcoholic liquor is absolutely prohibited.

Epileptics are not allowed to work under conditions which may constitute a hazard in the event of an attack (at great heights, near water reservoirs, operating machinery, fire, etc.).

Care. During an epileptic fit the patient must be carefully watched to prevent serious injury. For this purpose it is necessary to put a pillow or something soft under the patient's head. The patient's arms and legs must be lightly held in place so that they do not get hurt. However, no force must be used to counteract the convulsive movements of the extremities because of the likelihood of injuring the patient (fractures, sprains). It is necessary to unbutton the patient's collar, loosen his belt, etc. It is advisable to put a spatula into one side of the patient's mouth. If a spatula is not available, the end of a towel or napkin tied in a knot may be used instead. This is done to prevent the patient from biting his tongue. The patient's head must be turned to a side so that the saliva may freely run out and the tongue does not interfere with respiration.

In cases of twilight state the attending personnel must be very resourceful in handling the patients. In these cases the patients may be greatly excited. To keep the patient still may require 3-4 people. If it is difficult to approach the excited patient, a blanket or mattress is used; the blanket or mattress is quickly thrown over the patient, and the rest of the personnel immediately approach the latter and hold him in place according to rules. Then, according to the physician's prescription, the patient is given a narcotic or chlorpromazine intramuscularly (see "Epileptic State", p. 166).

The epileptics must be continuously watched, and no conflicts or quarrels with the other patients must be allowed.

SCHIZOPHRENIC REACTION

The term *schizophrenia* is of Greek origin and means "splitting of the psyche" or "splitting of the soul". The schizophrenic reaction is most commonly observed at the ages of 18-30 and is one of the most widespread mental diseases. It affects men and women alike. Considerable contributions to the knowledge

of the schizophrenic reaction were made by S. Korsakov, E. Kraepelin and Y. Bleuler.

Symptoms. The onset of the disease may be acute or gradual. If the disease develops acutely, it is often characterized by either motor excitement or total inhibition.

In many cases the first signs of the disease are peculiar headaches. The patients complain of a sensation of pressure within the head, as though the head were bursting. This is often accompanied by sleep disturbances.

The younger the patient, the more frequent a state of increased sleepiness and, contrariwise, the older the patient, the more common the state of insomnia.

Some cases are characterized by general debility and sluggishness. In the company of friends the patient feels awkward and therefore prefers solitude. Sometimes such patients retire to their apartments and do not show up for a long time. Others, on the contrary, may, after the onset of the disease, wander through streets for hours and even days on end without knowing any rest. Some patients become irritable, especially with respect to their closest kin. With the development of the disease students experience increasingly greater difficulties in their studies. They find it difficult to learn anything new, cease to understand what they read, and therefore reread the same page several times. Sometimes the patients state that they have somehow changed and are no longer what they used to be; they often feel perplexed.

The schizophrenic reaction is characterized by hallucinations, especially olfactory and auditory. In cases of olfactory hallucinations the patients smell something putrid, fetid, various gases, etc. Some patients believe that it is they themselves who emit the offensive odours. For example, one patient maintained that he smelled of urine which "soaked into his legs" while he was still a child; this patient did all he could to get rid of the odour, bathed several times a day, rubbed himself down with toilet water, etc. In cases of auditory hallucinations the patients hear voices which issue orders or censure their behaviour. Sometimes the patients are merely "called by name". The patients' attitude to their hallucinations varies (it may be critical or uncritical).

The cases where the "voices" are perceived "within the head" are referred to as pseudohallucinations which are often observed in the schizophrenic reaction.

Various disturbances in thinking appear; of these the most common are so-called blanks, "obstruction" of thoughts, "slipping" and tendency to symbolization. The patients sometimes

state that all their thoughts suddenly disappear, then reappear some time later. At times they lose their ability to direct their thoughts. The numerous thoughts which occur to the patients involuntarily are known as mentism.

Sometimes a patient may simultaneously have two diametrically opposed thoughts or two antagonistic strivings.

Autism—withdrawal from reality and a tendency to morbid concentration on oneself—usually appears early in the clinical picture of the disease. In such cases it is extremely difficult to talk to the patient and come to any agreement. For example, if the patient speaks to anybody, his statements often have nothing to do with the conversation.

Some patients exhibit a so-called double orientation; they may correctly name the place where they are and yet believe that they are in prison.

In the schizophrenic reaction the patients not infrequently develop delusions of reference, persecution, physical influence, poisoning and hypochondria.

In the beginning of the disease the delusions are not yet systematized. Subsequently they may develop into a complex system. In some cases disturbances in the stream of thought are observed. The patient utters grammatically correct phrases, but there are not logical connections between them. Very significant in this disease are certain changes in the emotional sphere. These changes depend on the duration and course of the disease. Ambivalence of feelings is, as a rule, observed in the initial stages of the disease; emotional hypesthesia may develop during later periods.

Various clinical manifestations of the schizophrenic reaction were described as disease entities in the middle of last century. These were catatonia, paranoia and hebephrenia.

Subsequent clinical observations have shown that all the aforesaid morbid states actually constitute one disease which can be manifested in various forms. All forms of the disease have a number of common signs which warrant their classification as a single disease—the schizophrenic reaction. These common signs are, in the first place, a splitting of the personality (ambivalent feelings and actions, simultaneous coexistence of diametrically opposed thoughts, double orientation), autism and gradual increase in pathologic phenomena.

Many forms of the schizophrenic reaction have been described, but we shall dwell on the four basic forms most commonly observed.

Simple Form. This form is characterized by the absence of such marked psychopathological symptoms as hallucinations,

Fig. 58. Schizophrenic with emotional hypesthesia and dementia

delusions and motor disturbances. It usually begins in youth and is marked by a slow increase in sluggishness and apathy. The patients lose interest in everything and may stay in bed without doing anything for days on end. Their working capacity decreases. Sometimes irritability appears, especially with respect to the closest kin. Disorders of thinking are usually observed; these may be manifested in mentism, disturbances in the stream of thought and retarded mental activity. In course of time the personality changes increase and may go as far as marked dementia and emotional hypesthesia (Fig. 58). The following case history may serve as an example.

Paient T, female, 18 years old, was in the clinic from December 6, 1948 to February 17, 1949. Was born at term and had grown and developed normally. Began attending school at the age of 8, studied well, successfully finished 10 grades and enrolled in an institute. Was always merry and sociable. In childhood had only one infectious disease—measles.

In the spring of 1946 the patient developed headaches and insomnia, found it more difficult to learn new material and noted that the subjects she had liked before ceased to interest her. Despite this she successfully passed her examinations, vacationed in the summer and felt good. In the autumn the headaches recurred, the patient slept poorly and took no interest in anything. She began to feel uneasy in the company of friends; at the institute she thought she was looked up on with suspicion and was mocked at. In the mornings she had to force herself to leave home, but did not go to the institute and wandered aimlessly through the streets. The indifference

and sluggishness gradually increased. She ceased to get out of bed and no longer washed, or brushed her hair, became rude and malicious toward her relatives, especially her mother of whom she had formerly been very fond.

Physical Condition. No pathologic changes.

Mental State. Correctly oriented in place, but not in time. Daily tells the physician she is well and cannot understand why she is kept in the hospital. Does not do anything all day long, either wanders aimlessly through the corridor or stays in bed. Is untidily dressed and her hair is uncombed. When advised to do something she usually says that nobody works in hospitals and that there is no sense in reading since she has already read enough books. Inclined to rationalization. Is emotionally cold. Has no plans for the future.

Catatonic Form. This form is characterized mainly by motor disturbances manifested in catatonic stupor or catatonic excitement.

In catatonic stupor the patients are motionless and may assume various postures—embryonal position (arms and legs flexed to the utmost and pressed against the trunk, the head bent forward so that the chin touches the chest) (Fig. 59) or with extremities extended. It is usually impossible to change their position. The patients exhibit *mutism*, i.e., a condition of

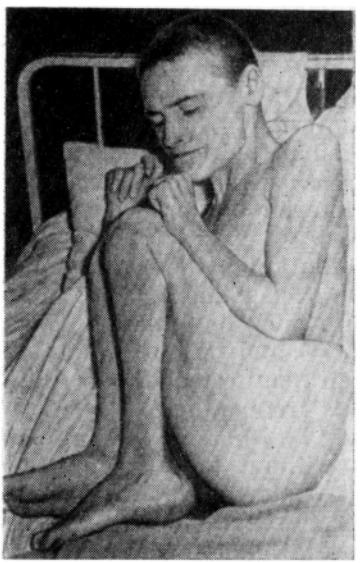

Fig. 59. Catatonic stupor. Embryonal pose

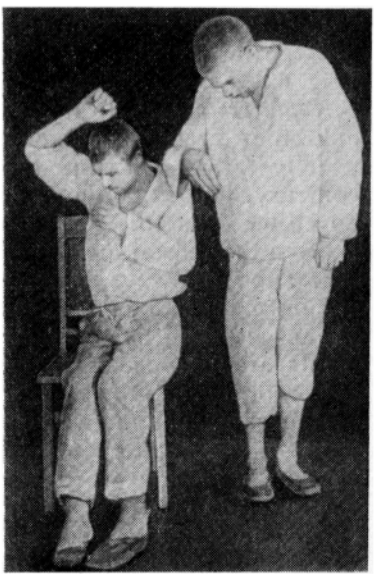

Fig. 60. Catatonic form of the schizophrenic reaction. Waxy flexibility

Fig. 61. Air cushion symptom

being speechless, and sometimes a state known as *catalepsy*, or *waxy flexibility*. For example, if you raise the patient's arm or leg, it will long remain raised (Fig. 60). Other patients hold their heads above the pillow, while in bed, so that there is a space between the head and the pillow. This is known as the "air cushion" symptom (Fig. 61). On contact with the patient's lips the latter sometimes form a pout—the "sucking" symptom (Fig. 62).

Negativism is one of the clear signs of this form of the schizophrenic reaction. The patients suffering from negativism usually fail to do what they are asked to or do things to the contrary. For example, if a patient is asked to open his mouth, he either fails to open it or closes it even tighter. Negativism is often the reason for refusing food.

It should always be remembered that patients in catatonic stupor may suddenly develop catatonic excitement. The latter is characterized by the following main signs: the patient's movements are purposeless, chaotic, bizarre and often impulsive, a stereotypy of movements and speech manifested in repetition of the same action, word or phrase is frequently observed. In cases of speech excitement (which may be isolated) the patients cry out separate words or phrases without any logical connection so that they are impossible to understand; this is so-called incoherent speech. Sometimes the patients repeat the words and imitate the actions of those around them (*echolalia* and *echopraxia*).

The excitement may be very brief (a few minutes) or may last many days and weeks.

Fig. 62. "Sucking" symptom in schizophrenic

It often ceases as suddenly as it began.

Compared with the other forms of the schizophrenic reaction the catatonic form runs, according to some authors, a more favourable course. There were cases in which the patients returned to their former occupation after protracted (lasting for years) catatonic stupor.

The following case history may serve as an illustration.

Patient D., male, 14 years old, was in the clinic from December 24, 1947 to March 27, 1948. Was born at term; grew and developed normally. In childhood had measles and scarlet fever. Began attending school at the age of 8, made good progress and read a good deal. Was sociable and fond of his friends.

In September 1946 began to complain of headaches, poor sleep, absent-mindedness and inability to concentrate on anything. Smelled unpleasant odours, refused food, voiced ideas of guilt, saying he did not deserve good food or clothes. Thought of suicide. This state lasted several days. In the summer of 1947 the headaches and absent-mindedness recurred, the patient suffered from insomnia, began to refuse food, was unable to do anything, sat in one position for hours on end, and smelled unpleasant odours. Often thought life was not worth living. Decided to commit suicide. Was examined by a psychiatrist and was hospitalized.

Physical Condition. No pathology.

Mental State. The patient was sharply inhibited. Sat in one position with head drooping, arms flexed in the elbows, hands hanging down for hours on end. Sharply resisted attempts to raise his head. Put in a chair against his will remained motionless despite repeated requests to get up. During the day the condition used to change, the inhibition was replaced by excitement and the patient rushed about the ward uttering inarticulate sounds or crying out separate, incoherent words. The movements were purposeless and uncoordinated.

After a course of treatment the patient went back to school.

Paranoid Form. The leading symptoms in the clinical picture of the paranoid form of the schizophrenic reaction are delusions, particularly delusions of persecution (persecutory paranoid state), reference (self-reference), poisoning, physical influence, hypochondriasis, and sometimes grandeur. Hallucinations are observed in this form more frequently than in the other forms. The patient's behaviour is often determined by his hallucinatory and delusional experiences (Fig. 63). The paranoid form most commonly develops at the age of 30-40. In cases of delusion of reference the patients think that everything about them has something to do with them. For example, if somebody nearby has coughed, the patient believes it to be some sign or hint addressed to him.

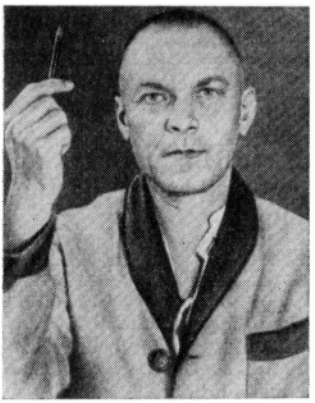

Fig. 63. Patient in state of paranoid grandeur (believes himself to be a great inventor; is telling about his "discoveries")

In case of delusion of persecution the patients imagine they are surrounded by enemies, people especially assigned to harass them, etc.

Sometimes they maintain that there is a special organization which for some incomprehensible reasons has them shadowed.

In cases of delusion of physical influence the patients assert that somebody is harming their health by means of special apparatus. One patient maintained that she was being cauterized every night by means of special apparatus with the result that her face and neck were burned.

The delusion of poisoning is observed quite often. In these cases the patients claim that their food is being poisoned, which is frequently the reason for their refusal to eat.

In cases of hypochondriasis the patients assert that their internal organs are atrophied or that they have no internal organs at all, that they do not assimilate the food they eat, that their brains have dried up and have become very small. Some patients believe they have cancer, "discover" all signs of this disease in themselves, and demand an operation, etc. Cases characterized by delusions and frequent hallucinations are referred to as the hallucinatory-paranoid form of the schizophrenic reaction. The following case history may serve as an example.

Patient P., female, 56 years old. Grew and developed normally, and was cheerful, sociable and of ready sympathy; early displayed a gift for music; was graduated from a conservatoire and then taught music. Was married and had a healthy adult son.

Fell ill in 1936. Became suspicious, overcautious, irritable and morbidly concerned with her health. Treated herself in her own way. Was hospitalized (in a mental hospital) several times. After discharge from the hospital felt

good and continued to work. The disease became aggravated in the summer of 1953.

While in the clinic the patient developed auditory hallucinations; she heard the voices of a man named Politov and his friends who accused her of infecting with syphilis the physicians and the students of the schools of music in which she taught. Politov "interrogated her, called her various offensive names, sang indecent songs about her and called her a fascist". The patient would stand in one position listening to his charges with bowed head. She stuffed her nose with soap because she had heard him say that her nose emitted a foul odour which poisoned those around her. Once she said Politov had told her the interrogation was over and she was innocent. Some time later, however, she began to hear his voice again. "He is scared that he did irreparable harm to my health and has therefore decided to destroy me". Since then the patient continuously heard the voice of her enemy telling her about all the outrages perpetrated on her. She heard the voice coming from the basement. She was sure Politov was hiding there, sent him food to appease him, implored the physicians to go down the basement and take away the roentgen apparatus, the box with radium "whose rays he was swinging about".

Hebephrenic Form. In this form of the schizophrenic reaction the patients' behaviour is dominated by affectation and silliness. The patients strike bizarre attitudes and during conversation often make faces (Fig. 64).

Their answers are of the nature of flat, silly jokes or contain elements of empty philosophizing and rationalization. Sometimes the patients are difficult to understand because their speech is incoherent. The patients often develop motor excitement. The following case history may serve as an illustration.

Patient K., male, 18 years old, was in the clinic from September 18, 1947 to March 4, 1948. Was born into a peasant family. Grew and developed normally. Was cheerful and fond of the company of his friends. Began attending school at the age of 9 and made average progress; early displayed artistic ability. Finished 4 grades and an industrial school. Worked as printer.

Fig. 64. Bizarre pose of patient with the hebephrenic form of the schizophrenic reaction

In the summer of 1947 began to tire easily, have headaches and vertigo. Lost his interest in everything, did not want to draw or paint, became negligent of his appearance and ceased to wash. Avoided meeting his friends and quarrelled with the members of his family. Behaved strangely at work, making many unnecessary movements, standing with his back to the machine and attempting to work in that position. One day he refused to go to work, would not leave his bed and wrapped himself in his blanket. Was placed in a mental clinic in that condition.

Physical Condition. No pathology.

Mental State. The patient had a clear consciousness, was correctly orientated in his surroundings and not entirely correctly in time. He did not associate with the other patients, walked about the ward alone, laughed without due reason, made faces, pouted, and made meaningless gestures with his arms. His stay in the hospital did not disconcert him; sometimes he said he wanted to do something, asked for a pencil and paper saying: "I want to draw", then long held the paper in his hands, laughed and put it under his mattress. Stayed in bed for hours on end with a newspaper in his hands, but did not read it and looked indifferently about himself or lay in bed with eyes closed. Displayed no emotions. On seeing his parents he tried to walk past them. His condition varied, consraint alternating with disinhibition. In the latter state he was affected, silly, often uttered incoherent phrases, sat down on the floor, waved his arms and said he was a "tame hen"

It should be noted that the distinction of various forms of the schizophrenic reaction is conditional because the clinical picture of the disease not infrequently includes symptoms of all the aforementioned forms. Moreover, it has been established that in the course of the disease one form may develop into another.

In children the schizophrenic reaction has a number of peculiarities in its manifestations and course. Simson's studies show that children never have actual delusions and that the important symptoms in the clinical picture are nocturnal fears and behaviour changes. In children the schizophrenic reaction tends to run a protracted course. The best prognosis, as G. Sukhareva points out, is in adolescence. Hypochondriacal complaints are the most important symptoms in the clinical picture of this period, catatonic symptoms being next in importance.

Course and Prognosis. The schizophrenic reaction is one of the diseases in which it is very difficult to make a definite prognosis. This is due to the fact that the course of the disease and the forms in which it manifests itself vary very widely. For example, in some cases the disease runs a protracted, unfavourable course from the very outset. Other cases are characterized by an early and deep remission which may be regarded as a sign of practical recovery. Subsequently the patient may never suffer an exacerbation of the disease. Sometimes, however, the first attack is followed after a certain period of time by other attacks, i.e., the

disease runs a so-called remittent course. During the remissions the patients often go back to work.

Frequent and protracted aggravations of the disease unfavourably affect the patient's working capacity and intellect and lead to more appreciable emotional changes—emotional hypesthesia.

The prognosis in the schizophrenic reaction is also connected with the form in which the disease manifests itself. For example, in the hebephrenic and simple forms the prognosis is less favourable.

The prognosis also depends on the patient's age: the course of the disease is less favourable in childhood and old age.

In rare cases the disease runs an extraordinarily acute course with catatonic excitement and marked somatic disturbances: generally grave condition, subfebrile temperature, petechial hemorrhages into the skin and the cerebral substance, blood changes, etc. (V. Romasenko). In some cases the patients die. The acute schizophrenic reaction was investigated by O. Kerbikov.

Far-advanced, unfavourable cases of the disease give rise to marked personality disorganization. Such patients are untidy, negligent of their appearance and interested only in satisfying their elementary needs. Some of them are excessively sluggish, others are periodically excited, and behave and talk incongruously and incoherently. Emotional hypesthesia and a peculiar feeble-mindedness are observed. Sometimes the patient cannot cope with life's simplest problems and yet may correctly answer most complicated questions.

Somatic Disturbances in the Schizophrenic Reaction. The schizophrenic reaction often exhibits certain pathologic changes of internal organs. The disturbances particularly frequently observed are those in the endocrine glands and the cardiovascular system. for example, thyroid, gonadal and adrenal insufficiencies, as well as a small heart and general infantilism. Sometimes the schizophrenic reaction is characterized by feebly marked disseminated neurological symptoms which are very unstable.

Pathologic Physiology of the Schizophrenic Reaction. According to I. Pavlov the schizophrenic reaction is based on diffuse protective inhibition in the brain. For the debilitated nerve cells of schizophrenics usual stimuli become excessively strong which leads to development of protective inhibition. The inhibition usually begins to develop in the cortex, but may descend to the brain stem. The varied clinical picture observed in the schizophrenic reaction is determined by the strength and extent of the inhibitory process. Catatonic excitement is observed in cases of inhibition of the cerebral cortex, when the subcortex drops out

of cortical control and, moreover, is stimulated owing to positive induction. That is why the movements in catatonic excitement are chaotic. Catatonic excitement sharply differs from the manic excitement observed in the manic-depressive reaction; in the manic-depressive reaction the cortex is in a state of excitation and all movements are therefore purposeful.

It is well known that caffeine intensifies the processes of excitation. Y. Popov who has extensively investigated the pathologic physiology of the schizophrenic reaction has observed that administration of caffeine to patients with catatonic excitement resulted in sedation, while in cases of manic excitement it increased the excitement. The reason for it is that in patients with catatonic excitement caffeine intensifies the processes of excitation in the cortex with the result that its regulatory influence on the subcortex is restored.

Hebephrenic excitement is believed to be associated with partial inhibition of the cortex and disinhibition of the subcortex.

In catatonic stupor inhibition, in addition to the cortex, also embraces the subcortex.

The negativism observed in the schizophrenic reaction may be divided into active and passive negativism. In passive negativism the patients do not do what they are asked. For example, asked to get up the patient remains sitting. Sometimes the patient does not comply with the request if it is made in a loud, or the usual voice, but does what is requested if the request is whispered. This is due to the presence of the paradoxical phase.

Active negativism is based on the phenomena of ultraparadoxical phase in the cerebral cortex. For example, what may be the reason that the patient flexes his arm when asked to extend it? The groups of muscles—flexors and extensors—are represented in the cortex by definite centres. When the patient is asked to extend his arm, a definite stimulus is transmitted to the extensor centre. Normally this stimulus would excite the extensor centre and the arm would extend. It is different in the schizophrenic reaction when the cortical cells are weak. Instead of excitation the stimulus transmitted to the weakened cells evokes protective inhibition. According to the law of positive induction, the inhibition developing in the extensor centre leads to excitation of the flexor centre and the arm flexes.

The "sucking" symptom in the schizophrenic reaction is but a manifestation of the sucking reflex connected with the subcortex, which with the development of the cortex becomes inhibited in the adult. In the schizophrenic reaction the cortex is in a state of inhibition, for which reason a number of normally inhibited subcortical reflexes are revived, disinhibited.

The autism and disturbed stream of thought observed in the schizophrenic reaction are also associated with inhibition in the cerebral cortex. Autism is due to the presence of the paradoxical phase in the cerebral cortex, in which the reactions to weak stimuli are stronger than they are to strong stimuli. As a result the traces of past perceptions (concepts) are of greater importance to the patient than the present stimuli. Hence, it is clear why the patient affected with autism does not answer to the point. For example, asked when he was graduated from higher school, the patient answers: "I had good schoolmates." Given caffeine the patient begins to answer more to the point.

Pathologic Anatomy. In old cases of the disease the brain (mainly the cerebral cortex) exhibits more or less marked phenomena of atrophy. The pia mater is sometimes thickened and opaque.

Microscopic examination of the brain reveals degenerative changes in the nerve cells, neuroglia and fibres. The nerve cells are, as a rule, atrophic, sharply contracted and contain a large amount of lipofuscin. Different layers of the cortex (especially the third layer) are observed to contain small foci of destroyed nerve cells. As a rule, the neuroglia fails to react or reacts but very weakly.

Cases of initial stages of the disease exhibit edema and a swelling of the brain, microscopically—grave signs of circulatory disturbances.

The character of the main pathoanatomical changes in the brain in the schizophrenic reaction denotes their toxic origin.

Etiology. As was already stated, from the point of view of pathologic physiology the schizophrenic reaction is based on weakness of the nerve cells. This weakness is caused by poisoning of the entire organism, including the brain, with toxic metabolites resulting from impaired metabolism (mainly impaired protein metabolism). The cause of the metabolic disturbances is as yet unknown.

Treatment. This chapter discusses only the principal methods of treatment now used in psychiatric practice, namely, insulin therapy, sleep therapy, sulfozin therapy and treatment with aminazine (chlorpromazine) which has of late come into use.

Treatment with insulin produces a certain change in metabolism and diminishes intoxication. Before instituting insulin treatment the patient's blood sugar is checked (on an empty stomach) and the patient is given a special sugar load. Administration of insulin reduces the amount of sugar in the blood; on an empty stomach the blood sugar is normally 90-110 mg%. With insulin this amount can be decreased to 10-20 mg%. A considerable reduction

in the blood sugar is followed by a so-called shock (hypoglycemic coma). The average insulin dose which produces shock is about 80-100 u. In some cases, however, shock developed on administration of 30, and in others—it did not occur after administration even of 200 u. To find the amount of insulin which will produce shock, the dose is increased gradually. The first dose is usually 4-8 u; it is daily increased by 4 u until it produces shock and is then used as the shock dose. The course of treatment consists of about 25-30 shocks.

In the state of shock the patients usually do not react to external stimuli and, as a rule, perspire profusely; their pupils are dilated. The patients are kept in the state of shock for 30-40 minutes and are then brought out of it. To terminate the shock, a patient is given an intravenous injection of 20-30 ml of a 40 per cent glucose solution. Within 1-2 minutes of the administration of this amount of glucose the patient regains consciousness. Following this the patient is given to drink 200 g of sugar (in the form of a syrup) and then breakfast. The nurse must personally watch the feeding of the patients. After termination of the insulin shock with glucose many patients are still in a stuporous state, for which reason they swallow with difficulty, retain the food in the mouth and may easily choke. The nurse must see to it that the patient drinks his sugar syrup and eats all of his breakfast, or the shock may easily recur.

In the event the patient does not regain consciousness within 15-30 minutes after administration of glucose, he is given another intravenous injection of 30-40 ml of a 40 per cent glucose solution and sometimes a subcutaneous injection of 1 ml of a 0.1 per cent adrenalin solution.

The underwear of almost all patients has to be changed because it is wet with perspiration. When glucose cannot be administered intravenously (in case of impalpable veins) the patient is fed the sugar syrup through a tube.

Treatment with shock doses of insulin is conducted only in hospitals. Before the onset of the insulin shock some patients exhibit a twitching of various muscles of the trunk, extremities and face and sometimes become excited; some patients have an epileptiform attack. In such cases the patients must be urgently brought out of hypoglycemia.

The attending personnel must always remember that in patients treated with insulin the shock may recur in the afternoon. If this happens, the physician must be immediately notified and all measures to bring the patient out of the state of shock must be carried out.

Treatment with Aminazine. Aminazine has of late been widely

used in psychiatric practice. In a number of cases its administration produces good results. Aminazine is administered per os or intramuscularly as a 2.5 per cent solution. The daily dose averages 300 mg. The treatment lasts about 2-3 months. The patients receiving aminazine must be carefully watched because some of them develop a complication in the form of a sharp drop in blood pressure at the moment they change from a horizontal to a vertical position (orthostatic collapse). Upon the onset of collapse the patient must be put to bed. The collapse occurs particularly frequently in the beginning of the course of treatment, for which reason the patients receiving aminazine must be strictly confined to bed during the first few days of treatment; their blood pressure should be measured every day. Treatment with aminazine not infrequently gives rise to infiltrates at the sites of the injections; dermatitis and jaundice are sometimes observed. To discover these complications in good time, the nurse must carefully examine the patient every day.

To prevent aggravation of the disease after a course of aminazine treatment, some patients continue to be treated with so-called sustaining doses; they receive tablets of 25 to 150-200 mg of aminazine a day. The schizophrenic reaction is also treated with reserpine (serpasil), stelazine, haloperidol, etaperazine.

Treatment with Sulfozin. Sulfozin is a 1-2 per cent suspension of sulfur in peach oil. It is administered intramuscularly (into the buttocks). Administration of the drug usually begins with 1 ml; subsequently this dose is either retained or increased to 3-4 ml, depending on the patient's reaction. The preparation is administered every third day. Within 10-12 hours the injection of sulfozin elevates the patient's temperature (to 39-40°C) and the site of the injection becomes painful. Hot water bottles may be recommended to mitigate the pain. The course of treatment consists of 5-7 injections.

Care. Schizophrenics frequently need careful nursing and supervision. They often refuse food, in which cases attempts are made to persuade them to eat or they are fed from a spoon. Sometimes they have to be fed through a tube. If a schizophrenic stands in one position for a long time, it is necessary to put him to bed (Figs. 65 and 66).

For greater details on nursing see chapter on nursing mental patients.

MANIC-DEPRESSIVE REACTION

The manic-depressive reaction is most commonly observed in youth, the disease affecting females somewhat more frequently than males. This reaction has a number of distinguishing char-

Fig. 65. Catatonic stupor. Patient stands in this pose for long periods of time

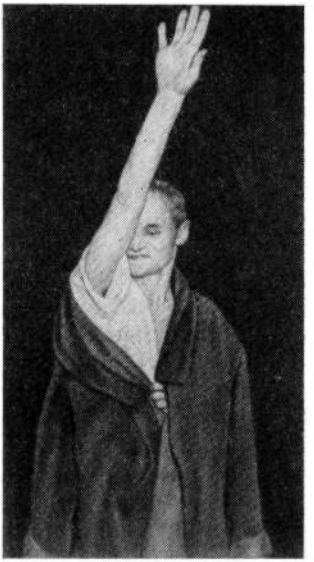

Fig. 66. Bizarre, unnatural pose of patient with the catatonic form of the schizophrenic reaction

acteristics. These include, firstly, the recurrence of manic and depressive attacks. The attacks may recur in various forms and run different courses; the manic and depressive attacks may alternate without any remissions, or there may be remissions lasting from a few days to several years. The duration of the manic and depressive attacks may also vary very widely. Most commonly an attack lasts from 2 to 10 months. The disease may begin with a depressive attack. There are also cases in which either depressive or manic attacks prevail.

The second distinguishing characteristic is that the remissions are marked by complete restoration of mental health. The patients usually go back to their former work and behave as they did before the illness.

Thirdly, it should be noted that however severe and frequent the attacks may be they never result in degradation of the personality.

Manic and depressive states were known even to the physicians in ancient Greece and Rome. But since the manic and depressive states sharply differ from each other they were long considered

manifestations of two different diseases. Only at the end of the last century did the German psychiatrist E. Kraepelin, after long observations and careful study of patients with manic and depressive attacks, arrive at the conclusion that it was not a matter of different diseases, but of one disease whose different periods were characterized by manic and depressive attacks. He originated the theory of the manic-depressive reaction. The name of the disease emphasizes that both the manic and depressive states are manifestations of the same disease.

Manic State. When a person develops a manic state he sees everything through rose-coloured glasses, as it were. The patients are active and in a state of elation. They tackle anything, meddle in everything, make bold plans which they strive to fulfill, and importune high officials. If such a patient is in the hospital, it is impossible to pass by him unmolested; the patient will unfallibly address himself with some question or proposition. The patients not infrequently overestimate their abilities; for example, having no knowledge of medicine they offer their own methods of treatment. This overestimation may sometimes go to the point of delusional statements. For example, a female patient, a lawyer by profession who successfully coped with her work during remissions, tried to persuade everybody around her, during a manic attack, that she had a fine voice and that the administration of the Bolshoi Theatre had already for several years been begging her "on bended knee" to sing the part of Carmen.

Another female patient asserted there was not a single man who was not in love with her. The manic state is characterized by increased sexuality. The patients often strike up casual acquaintances. One female patient daily painted her lips and cheeks red, plaited red ribbons into her hair and demanded dye for her hair. One day a floor-polisher came to the ward with a bucketful of floor-polish, and the patient tried to dip her head in the bucket in order to dye her hair. In the manic state the patients talk a lot, but it is not always possible to understand them. Owing to the flight of ideas their speech is sometimes so rapid that it may appear incoherent, especially since the patients begin to omit words and even phrases. They often admit that their tongue fails to keep up with the flight of their ideas. Since they talk so much, they grow hoarse. The noisiness and importunity of the patients in the manic state distresses and irritates the calmer patients.

The patients are readily distracted and never finish anything they have started; they sleep very little (sometimes 2-3 hours a day), but never feel tired (Fig. 67).

Fig. 67. Patient in manic state

In the manic state the patients are usually in a gay mood, but sometimes, especially if their requests are not granted, they may become angry and aggressive.

The following case history may serve as an illustration.

Patient B., male, 72 years old, was the third child in the family. As a child grew and developed normally, began attending school at the age of 7, was capable and successfully graduated from secondary school and an institute. Worked as an executive until 1945. The first manifestations of the disease appeared in early adulthood.

Attacks of depression began to occur periodically without any apparent reason and lasted several weeks on end. Subsequently the attacks of melancholy were followed by an entirely different state, the patient becoming, for no reason, excessively gay, active, very talkative, fussy and importunate. During such periods the patient was, as he put it himself, in an extraordinarily pleasant state. "Everything appeared bright, colourful and beautiful, everybody seemed nice and sweet, I was full of vim, vigour and vitality, wanted to work, and never felt tired." Some periods of remission lasted several years. During these periods the patient worked. He was placed in a mental hospital for the first time in 1931 and subsequently was hospitalized many times.

During his last admission to the hospital the patient very soon came to know all the patients in the ward, immediately started meddling in all the affairs of the personnel, advised and instructed them on managing the patients, and offered his help to the physicians in treating the patients by

his method. In the ward he was fussy and importunate, never stopped talking, arguing or giving advice. Very readily entered into conversation with the physicians and always smiled good-naturedly. Sometimes he had fits of anger and irritability, but soon calmed down and laughed merrily again; was inclined to overestimate his abilities.

Fig. 68. Depressive state

Depressive State. In the depressive state the patients take a dim view of everything, are always sad and are not amenable to any external influences (Fig. 68). They usually speak in a low voice and slowly, move very slowly and most of the time sit about with head drooping. The inhibition may reach such an extent that this state is referred to as depressive stupor.

With the onset of depression the patients' attitude to their relatives and friends changes. A female patient was heard to say: "I know they are my children, but I have no feelings for them". This is called morbid psychic insensibility (anesthesia psychica dolorosa). It should be noted that patients in the depressive state are always worried by the change in their attitude to their relatives, whereas schizophrenics with emotional hypesthesia are not. In the depressive state patients may express delusional ideas, most commonly delusions of guilt. They reconsider all their past and often state that all their acts were mere deception which did irreparable harm to everybody; sometimes they maintain they are not ill, but are simply wicked malingerers, etc. When greeting the physician they refuse to shake hands because they believe themselves unworthy of it. These ideas sometimes lead them to the conclusion that there is no sense in living, and they refuse to eat, in which case they must be immediately hospitalized. Unaware of the patient's condition the relatives are sometimes against hospitalization and must therefore be explained the danger of their attitude because at home it is easier for the patient to commit suicide. Patients may also attempt suicide in the hospital and must therefore be carefully watched.

At the height of depression attempts at suicide are not so common since, owing to the marked inhibition, the patients

cannot carry their plans into effect. The number of suicides increases during termination of the depressive state because at this time the inhibition diminishes while the melancholy mood persists.

At the height of depression the patients sometimes begin to move about, tear at their hair and rend their garments, hurt themselves, etc. This state is called an outburst of melancholy (raptus melancholicus). The possibility of such states must always be borne in mind.

The following is an example of the depressive state.

Patient M., female, 38 years old, is not working. There were no mental patients in her family. She developed normally. Exhibited changes in mood since childhood. Believes to have fallen ill 3 years ago when for no apparent reason she suddenly found herself in low spirits. She thought her condition was hopeless, refused to consult a physician and stayed at home. Made several attempts to commit suicide. Lost considerable weight in the last two years.

Physical Condition. Rapid pulse (up to 96 beats per minute) and constipation.

Mental State. Correctly oriented in place, time and surroundings. Speaks in a low voice, head hanging low, looks mournful. Is concentrated on the idea that she will never recover, that her condition is hopeless and that she is a burden to everybody. Believes death to be the only way out. Considers herself guilty towards her sister whose time she takes up and whom she gives a lot of trouble. She is sad, moves about slowly and answers questions in monosyllables.

Mild forms of the manic-depressive reaction without marked manic and depressive phases are referred to as *cyclothymia.* Hence, cyclothymia is not a disease entity, but a mild form of the manic-depressive reaction. Patients affected with this form of the disease are sometimes treated in dispensaries.

The manic-depressive reaction is sometimes designated as *circular insanity* (marked by alternating manic and depressive episodes). For example, the disease begins with the manic phase which upon termination is immediately followed by the depressive phase without a remission. In the severest forms of cyclothymia the phases follow one another without a remission. In addition to depressive and manic states there are also so-called mixed states in which the symptoms characteristic of both manic and depressive states are observed simultaneously. For example, the patient is melancholic, voices ideas of guilt, and at the same time is not inhibited, but excited. Such patients are the most likely to commit suicide. Their condition is known as *agitated melancholia.* The reverse may also be the case, i.e., the patient may be in a joyous and gay mood and yet be inhibited, as in

the depressive state. Such cases are referred to as *manic stupor*. These states serve as a proof that the manic and depressive phases are manifestations of the same disease.

Somatic Disturbances and Pathologic Physiology of the Manic-Depressive Reaction. Many authors have pointed out various symptoms in the vegetative nervous system characterizing this disease, but a systematic study of the vegetative nervous system was made by V. Protopopov who established a number of symptoms which are always discovered in both the manic and depressive phases. These symptoms are dilated pupils, rapid pulse and constipation. The patients begin to lose weight from the very outset of the disease. Absence of menstruation is often observed in women all through the attacks of the disease. All these disturbances are due to the same cause—predominant influence of the sympathetic division of the vegetative nervous system.

V. Protopopov unified all these symptoms under the designation of "somatic syndrome of the manic-depressive reaction". Before the end of an attack this syndrome begins to break up. The patient ceases to lose and starts to gain weight. This is followed by normalization of the pulse rate and improvement of the intestinal function. The dilation of the pupils persists the longest.

The presence of this syndrome in both phases confirms the connection between the manic and depressive states. The manic-depressive reaction is marked by a rise in blood pressure which must be regarded as a functional state produced by the predominant influence of the sympathetic nervous system.

V. Protopopov has suggested the hypothesis that in the manic-depressive reaction a focus of inert excitation forms in the subcortical region (the hypothalamus) and, consequently, all reflexes running through the subcortex are intensified. His investigations have shown the manic and depressive states to be marked by increased sensitivity to such stimuli as electric current, heat and cold. The patients usually experience an unpleasant sensation throughout the body. The hypothalamus has very much to do with regulating somatic and metabolic processes. The increased excitation of this region in the manic and depressive states favours increased metabolism, which leads to excessive expenditure of energy. In the course of the disease the patient may lose 10-15 kg and even more.

In the manic-depressive reaction carbohydrate metabolism alters the most. The amount of sugar in the patient's blood increases and the patient utilizes more sugar. The level of lactic acid is low because lactic acid is rapidly eliminated from the

blood. This explains why the patients never tire in the manic state. The increase in fat metabolism is due to exhaustion of the carbohydrate reserve. In cases where an adequate carbohydrate level can be ensured no disturbances in fat metabolism are observed. Protein metabolism is barely affected.

Studies of conditioned reflexes in the manic and depressive states have revealed that they can be formed comparatively easily. Great difficulties arise when attempts are made to extinguish them or to elaborate differentiations. This is due to weakness of active inhibition. Processes of excitation in the cortex predominate in the manic state, while in the depressive state the inhibition is of a passive character although the cortex is inhibited.

Etiology. It has been established by a number of scientists that the beginning of the attacks is associated with metabolic disturbances. The causes of these disturbances are as yet unclear.

Treatment. Prolonged warm baths (36-37°C) are helpful in both the manic and depressive states. The baths may be continued for several hours, but it is necessary carefully to watch the patients' heart action.

Warm baths reduce metabolism and act as sedatives. Sometimes small doses of insulin (5-10 u) are prescribed. Simultaneouly the patients must be given plenty of sweet tea, sweets, etc. Food containing a lot of carbohydrates is recommended because it favours accumulation of glycogen in the liver. In cases of excitement during the manic state the patients are given bromides and 0.2-0.3 g of amytal sodium. Intramuscular or peroral administration of aminazine is also helpful.

In cases of depression a good effect is produced by subcutaneous unsufflation of 300-600 cc of oxygen. Patients with marked depression are administered opium. Even prolonged administration of opium in this state does not result in habituation. Since opium intensifies constipation it is given in combination with rhubarb. Depressive states have of late been treated with iproniazid (marsilid), imizin (carbamyl piperazine diethyl citrate).

Aminazine is now widely used (up to 200 mg a day per os or intramuscularly) in both manic and depressive attacks. In manic states it acts as a sedative, in cases of depression it reduces the melancholy. There are reasons to believe that aminazine shortens the duration of the attacks.

Psychiatrists are now faced with an important problem—to learn to prevent attacks of the manic-depressive reaction. Protopopov's last studies hold out a certain promise. He has found that patients with the manic-depressive reaction have metabolic

disturbances not only during attacks, but also during remissions. By influencing the metabolism during the remission it is possible considerably to postpone the onset of attacks.

Care. Patients in the depressive state must be under constant and unremitting observation. Gentle and sympathetic treatment mitigates their melancholic state and sometimes keeps them from attempting suicide. It is necessary to watch the patients' diet. If the patient refuses food he must be persuaded that proper observance of the regimen facilitates recovery. Sometimes the patients have to be fed from a spoon. Artificial feeding is resorted to only in extreme cases.

NEUROSES

A neurosis is a functional disease of the central nervous system. The development of a neurosis is usually associated with prolonged emotional stress which makes excessive demands of the basic nervous processes (excitation and inhibition) or of their mobility; this leads to overstrain of the central nervous system and derangement of higher nervous activity. Somatic diseases also contribute to the development of neuroses.

The following basic neuroses are distinguished: neurasthenia, psychasthenia, hysteria and obsessive compulsive states. Some neuroses have been produced experimentally on animals (experiments of M. Petrova). I. Pavlov pointed out that, in addition to the first signal system common to both man and animals, man also has a second signal system; he therefore distinguished purely human neuroses—psychasthenia and hysteria. Particularly affected in these neuroses is the activity of the second signal system and its interaction with the first.

As was already stated, I. Pavlov divided all people, on the basis of the relations between the signal systems, into three types—intellectual, artistic and intermediate. Clinical observations show that, if people with different types of nervous system are exposed to difficulties (conditions which lead to derangement of higher nervous activity) they may develop corresponding forms of neurosis. Persons with the intermediate type of nervous system in which neither of the signal systems predominates most commonly develop neurasthenia, persons with the artistic type of nervous system—hysteria, and the intellectual type—psychasthenia. Obsessive compulsive reactions more readily arise in intellectual people, although they may also develop in others.

From the point of view of general types of nervous system common to both man and animals neuroses most easily develop in people with the extreme (weak and unbalanced) type of

higher nervous activity. Under certain conditions, however, neurosis develops in persons with a strong and balanced type of higher nervous activity.

It should be noted that such syndromes as neurasthenia, hysteria, etc., may arise as a result of other diseases (internal diseases, lesions in cerebral vessels, etc.). In such cases the underlying diseases must be treated first.

Neurasthenia

The leading symptom in the clinical picture of neurasthenia is "stimulatory weakness". The patients exhibit increased excitability and fatigability and have to rest soon after they begin working. They find it difficult to keep their emotions in check; they may violently react to an insignificant remark and use sharp words, but usually calm down very soon. They find it particularly difficult to restrain themselves and wait. For example, a patient could not wait even a minute for his turn in physiotherapy.

Sleep disorders are very constantly observed in all patients of this group. These patients are light sleepers, cannot fall asleep for a long time or wake up too early in the morning and cannot fall asleep again. Their sleep is so light that they often hear everything that goes on around them. They frequently have unpleasant dreams. In the morning they do not feel refreshed as do healthy people. During the day they are drowsy and somewhat indisposed. They complain that they can no longer cope with their work, and sometimes have unpleasant sensations in different parts of the body. Some patients think their memory is impaired. Actually it is not a question of memory, but of attention. The ability to concentrate the attention diminishes because the patients are easily distracted by everything that goes on around them.

The patients are excessively sensitive to pain stimuli. In connection with this they often refuse to take injections, to submit to blood tests, etc. Their tendon reflexes are increased. The patients have sexual disturbances, most commonly in the form of premature ejaculations.

Pathologic Physiology of Neurasthenia. The essence of neurasthenia was revealed by the studies of Pavlov's school. Neurasthenic symptoms are the result of weakened processes of internal inhibition and excitation in the cortex.

It should be remembered that inhibition moderates excitation. The cells restore their energy resources only when they are in a state of inhibition. Sleep is based on internal inhibition. Since

internal inhibition is disturbed (weakened) in neurasthenia it is clear why the sleep of neurasthenic patients is light. That is why the efficiency of the nerve cells is not completely restored and the patients soon tire.

The disturbances in attention are also due to weakening of the process of inhibition. When a person sets out to do anything a focus of excitation forms in his cerebral cortex and inhibition develops around this focus. Weakening of inhibition makes it possible for new foci of excitation to form with the result that the slightest noise distracts the patient.

Etiology. Neurasthenia is most commonly caused by strenous work, lack of rest, long, unpleasant emotional stress, insufficient sleep, etc. In the U.S.S.R. neurasthenia is a rare occurrence.

Treatment. To begin with, the patient must be given rest and prescribed a very strict regimen. Administration of bromides is advisable because bromides intensify the processes of inhibition thereby favouring restoration of the efficiency of nerve cells and adjusting sleep.

Hysteria

This disease was named after the Greek word *hystera* meaning uterus. Ancient Greek physicians believed that the disease was due to wandering of the uterus through the organism. A truly scientific conception of hysteria was made possible by Pavlov's investigations.

The clinical picture of hysteria varies very widely and its manifestations sometimes resemble the symptoms of other diseases so much that hysteria is called the "great simulator". The main symptoms of hysteria are divided into four groups—hysterical attack, consciousness disorders, somatic disorders, and character peculiarities.

Hysterical Attack. The onset of an hysterical attack most commonly depends on external conditions, especially if they include factors which traumatize the patients mentally, or if the situation in some way resembles unpleasant past experiences. In an hysterical attack it is impossible to establish any sequence in the patients' movements. The reason for it is that the character of the movements often reflects the experiences of the particular patient. The consciousness is never completely clouded and it is only a matter of a narrowed field of consciousness. The patients therefore to a certain extent retain their reactions to the external environment.

An hysterical attack may last from a few minutes to several hours. The attack is always longer if the patient is surrounded by people. As a rule, hysterical attacks are most common during

the day. The patients do not get so severely hurt as do those in epileptic attacks (for differential diagnosis of hysterical and epileptic attacks see the chapter on epilepsy). In hysterical attacks the reaction of the pupils to light is retained and the other reflexes can also be evoked. A patient developed an hysterical attack after the child she attended to drawned. During the attack she exhibited a narrowed field of consciousness, she rolled on the ground and moved her arms in a manner indicating that she was attempting to seize and hold somebody. The attack lasted about an hour. Subsequently she had attacks every time children or care of children was mentioned.

Consciousness Disorders in Hysteria. Hysteria is characterized by a twilight state of consciousness. The patients perceive the surroundings from a certain point of view. Whatever happens is evaluated by the patients, not as it really is, but against the background of their former experiences. If the patient is under the impression that he is at the theatre, he takes all those around him for either spectators or actors, and all the surrounding objects for things one usually sees at the theatre. This state may last a few minutes or many hours.

The hysterical consciousness disorders include the state of *puerilism.* The patient thinks he is a small child and begins to play dolls and ride a stick. In speech and behaviour the patients imitate small children. For example, a 50-year-old woman patient asked the physician who was making his rounds to take her up in his arms.

This group of consciousness disorders includes the picture of *pseudodementia* (false feeble-mindedness). Such patients give incongruous answers to the simplest questions, and the simpler the question, the more absurd the answer. The patient's expression is, as it were, deliberately silly—the patients stare, intensely knit their brow. Whereas in puerilism the patient acts as a child, in pseudodementia he acts as a mental patient.

Puerilism and pseudodementia type of consciousness disorders last for weeks and even months. These states may often be observed during proceedings in an action at law.

In short, hysterical consciousness disorders are characterized by a narrowing of the field of consciousness about certain concepts.

Somatic Disorders. The somatic sphere exhibits various disorders of an hysterical origin. The character of these disorders is associated with the patients' concepts of particular diseases, i.e., the manifestations of the disease will reflect the given patient's ideas of this disease.

Hysteria is often marked by motor and sensory disorders. The

motor disturbances include pareses, paralyses (monoplegia, paraplegia, hemiplegia, etc.) and hyperkinesias. In hysterical paralysis the tone of the muscles is unaffected, the tendon reflexes are unimpaired, and there are no pathologic reflexes or atrophies; in other words, the clinical picture of paralysis shows no signs of organic lesions in either the central or peripheral nervous systems. A peculiar motor disorder accompanying hysteria is so-called *astasia-abasia,* i.e., an apparent inability to walk or stand, although the patient retains all movements and coordinations in the legs during examination in bed. Hysterical hyperkinesias vary and may manifest themselves in tremor of the hands, legs, the whole body.

The characteristic feature of sensory disorders (most commonly anesthesia) in hysteria is that the spread of the sensory disturbances is not associated with the anatomical location of the sensory conductors. For example, in hysterical hemianesthesia the borderline of the sensory disorders runs strictly along the midline, in anesthesia of the hands the sensitivity is disturbed according to the "gauntlet" type, in anesthesia of the legs—according to the "socks" or "stockings" type.

Hysterical discorders also include speech disturbances—mutism. stammering, aphonia (voicelessness), or deaf-mutism (surdimutism)—and not infrequently gastrointestinal disturbances—vomiting, intestinal paresis, hiccup, etc. There are also cases of hysterical blindness (amaurosis) and blepharospasm.

Hysterical Character. The patients are excessively emotional, and their behaviour is very largely determined by their emotions; their concepts are also largely coloured by their emotions.

An inclination for fantasy is one of the traits of this character. When the patients recite fictitious occurrences they sometimes let their imagination run away with them to such an extent that they begin to believe them themselves. These patients do all they can to be in the limelight. Returning to work after her vacation one patient stated that she had just had a great misfortune, namely, that all of her family had been killed by gangsters the night before. Upon investigation it was all found to be a mere invention.

The patients are observed to be very fond of bright colours. Many of them prefer clothes which attract everybody's attention.

Pathologic Physiology of Hysteria. I. Pavlov pointed out that persons suffering from hysteria have a weak cortex with a predominant weakness of the second signal system, which leads to disinhibition of the subcortex and the first signal system, which accounts for a good deal in the clinical picture of hysteria. Man's

subcortex contains the central part of the neural arc, the site of unconditioned reflexes, many of which are instincts, developed over a number of generations; the manifestation of these instincts may be suppressed by the cortex. In a person with a weak cortex these instincts may under trying conditions manifest themselves as passive defense reactions which in some cases may take the form of motor excitement (convulsive hysterical attack) and in others—of motor inhibition (hysterical stupor). Hysterical attacks may arise in response to direct stimuli (psychotraumatic situation) and to factors resembling such a situation. In the latter cases the attacks are based on the conditioned reflex mechanism.

Owing to the weakness of the nervous processes hysteria is marked by considerable external inhibition (marked negative induction) which easily develops and leads to consciousness disorders.

The various somatic disturbances observed in hysteria are due to inhibition developing in the cortical cells. Under the influence of ideas and external stimuli of certain strength the nerve cells of various cortical analysers may become stably inhibited with resultant paralyses, deafness, blindness.

The character of hysteriacs has many traits in common with that of children. The cortex of a child is as yet insufficiently developed, and the subcortex plays an important part in the child's behaviour. In hysteria the subcortex easily rids itself of the influence of the cortex owing to the latter's weakness with the result that hysteria is marked by increased emotionality. The emotions also exert a certain influence on the patients' ideas. Hence, the emotional logic, i.e., in making inferences, arriving at conclusions the patients are guided not by reason, but by feelings.

Etiology. Hysteria equally affects men and women. The disease most readily attacks persons with a weak nervous system and is usually caused by a psychotraumatic situation. However, it may develop not only in persons with a weak nervous system. Various factors may weaken the cortex, and especially the second signal system, even if they are sufficiently strong.

Treatment. Measures are taken to eliminate the symptoms, for which purpose psychotherapy, physiotherapy and roborant treatment are administered. Hysteriacs, like all other patients, must be treated kindly and sympathetically. It should be remembered, however, that hysteriacs must not be placed under conditions where the disease gives them any advantages.

Psychasthenia

Psychasthenia usually develops in persons of the intellectual type, i.e., people with a predominance of the second signal system. The main clinical manifestations are overanxiousness, an inferiority complex and obsessive compulsive states. Psychastheniacs live in a world of constant doubts. The doubts increase with the increased complexity of the problems facing them. A simple problem requiring immediate solution may be meditated on for hours, the patient remaining inactive and failing to make any decision. Sometimes, after making up their minds, such patients hasten to carry their decision into effect in order to rid themselves of their tormenting doubts.

Psychastheniacs are diffident and underestimate their own abilities. Every difficulty arouses a panic fear and a feeling of inadequacy. They check up several times on every piece of work they have done for fear least they have done it incorrectly. One psychastheniac, a chemist by profession, would check up several times on the medicines he made and would then continue to doubt their correctness after dispensing them. His profession tormented him so much that he had to give it up and become a navvy. But here, too, he found things to doubt. After laying a pipe the patient would begin doubting that he laid it properly and would dig it out several times to make sure.

The psychasthenic traits increase upon weakening of the nervous system. The patients are overanxious about their health. In such cases they concentrate their attention on their sensations, consult physicians and listen to every word they say, always apprehensive of some concealed meaning. Complex and dangerous situations for a time free such patients from their anxieties and obsessive compulsive states.

Pathologic Physiology of Psychasthenia. Psychasthenia is based on a disturbed relationship between the first and second signal systems, with the second signal system predominating. This and, as Y. Popov points out, the disturbance in the induction relations (the developing focus of excitation does not give rise to stable inductive inhibition) explains the patients' inclination to rationalization and doubts. The interaction between the cortex and subcortex is also disturbed.

Treatment. Strict regimen. In cases of decompensation—psychotherapy, roborant treatment.

Obsessive States

Obsessive states may develop in persons who are not psychasthenic in character. Most commonly they arise acutely. The

clinical picture may consist only of obsessions and compulsions. Such cases are referred to as obsessional neuroses. The obsessions may vary very widely (see chapter on obsessive compulsive reactions).

Usually the patients long conceal their obsessions from their associates and retain their working capacity. Not infrequently, however, the obsessions and compulsions increase and the patients consult a psysician. The obsessive states intensify in the evening owing to fatigue.

Pathologic Physiology of Obsessive States. As has already been mentioned, obsessive states are conditioned by an inert focus of excitation or the ultraparadoxical phase.

Etiology. Obsessive states arise as a result of overstrain of the nervous processes in trying situations (psychic trauma). Somatic diseases serve as contributing factors.

Treatment. A good therapeutic effect in the treatment of obsessive states is produced by bromides, librium (chlordiazepoxide) aminazine, reserpine and caffeine. The patients almost always feel relieved after a talk with a psychiatrist.

REACTIVE PSYCHOSES

Reactive states are usually temporary mental disorders arising as a result of psychic trauma. Such states are therefore also called psychogenic. Reactive states may be due to many conditions and causes. The first to be considered is the type of nervous system. Mental disorders occur more readily in persons with a weak type of nervous system. A very important part is played by infectious diseases and other harmful factors which weaken the central nervous system. Reactive states easily develop during pregnancy and the puerperium. There is a certain tendency to development of reactive states during the involutional period. The onset of the disease depends on the character of the psychic trauma, its intensity, duration, etc.

The clinical picture resulting from psychic trauma varies. Reactive stupor, depression, paranoid states and iatrogenias are most commonly observed. In the Soviet Union the reactive states are studied by N. Felinskaya.

Reactive Stupor

In this condition the patients are completely immobile; sometimes the immobility may be replaced by excitement. Very significant is the patients' emotional state; in these cases, whether in a state of inhibition or excitation, the patients do not display total indifference to their surroundings. After the cessa-

tion of this state they exhibit amnesia. Reactive stupor most commonly develops after sudden catastrophies (earthquake, flood) and severe psychic traumas (for example, sustained during proceedings in an action at law).

Reactive Depression

A depressive mood predominates in the clinical picture of this condition. All of the patients, statements are connected with the psychotraumatic situation responsible for this condition. Death in the family is one of the causes of reactive depression. In these cases even joyous events aggravate the state of melancholy. The patients very willingly discuss the topic that agitates their minds and look for sympathy. Their sleep is, as a rule, disturbed. If there are any dreams, they are associated with the circumstances of the psychic trauma. The patients' hallucinations, if there are any, also have to do mainly with this subject. The following may serve as an example. During the war the patient had been notified of the death of her husband. This happened at the time she was nursing her baby. The patient immediately lost her milk. She harboured thoughts of suicide. She could not sleep, was continuously depressed and felt as though something was compressing her heart. Two weeks after receiving the notification she heard a knock at her window. Upon drawing the curtain aside she saw her husband. It was winter. The patient ran outside barely dressed, but found none at the window. She started running around the house calling her husband. Her relatives took her back into the house. The same visual and auditory hallucinations recurred almost every day. This lasted about two months, after which the patient's condition improved and she was soon able to go back to work.

In reactive depression the patients do not usually exhibit stable inhibition; if there is any inhibition at all, it is of short duration.

Reactive Paranoid State

In connection with a traumatic situation the patients may develop various delusions. The delusion of persecution is the most common. The patients maintain that they are being shadowed and that they are in danger. This delusion differs from the delusion of persecution observed in the schizophrenic reaction in that it is confined within certain limits, its content being closely connected with the conflict situation that has led to the paranoid state. The persons by whom the patient alleges to be persecuted are those who took part in the conflict. The emotionality of these patients is most commonly somewhat increased.

IATROGENIA

Iatrogenias are morbid states resulting from improper behaviour of the medical personnel with respect to the patient. The medical personnel must always be very careful of what they say to patients concerning their health. They must not use special terms which the patients may interpret in their own way. We observed a patient whose morbid state developed after a careless statement made by a physician in a sanatorium. The patient had a certain cardiac insufficiency, for which reason she took leave and went to a sanatorium. In the sanatorium there was a park in which the patient liked to spend a good deal of her time. She did that for 3 days after which the sanatorium physician told her that in view of her heart disease she should walk only from bench to bench. The same day, after walking a dozen steps, the patient felt a pain in the cardiac region and had to sit down. Soon she found she was no longer able to walk. She recovered only after a course of treatment in a mental clinic.

It should always be remembered that many patients very carefully listen to the statements made by medical staff concerning the diagnosis and prognosis of their disease and then make definite and often incorrect inferences which are productive of psychic trauma.

Treatment. In treating reactive states it is first of all necessary to eliminate the psychotraumatic factors responsible for the particular state. In some cases it is best to hospitalize the patient. If the patient's state constitutes no hazard either to himself or to his associates, the patient may sometimes be advised to change his residence. The patient's condition permitting, he must be given something to do to divert him. General roborant treatment is always helpful. Psychotherapy has also proved very effective. Andaxin, librium, aminazine, transamine (tronylcypromine) and other drugs are also prescribed.

Basic Psychotherapeutic Principles

The term psychotherapy implies a complex of curative measures, including the hospital atmosphere, the attitude of the medical personnel to the patient and the special methods of treatment; the latter include the talks between the physician and patient and hypnotic suggestion.

Spacious and light wards, cleanliness, comfort and quiet in the medical institution, and a considerate and sympathetic attitude of the personnel (from the physician to the ward attendant) favourably affect the patient's state of mind and greatly contribute to recovery.

Hypnotic suggestion is one of the very important special methods of psychotherapy. Pavlov found that hypnosis is partial sleep during which the word acquires great power as a stimulus; this may be used for therapeutic purposes. A verbal suggestion made to a person under hypnosis and aimed against certain morbid manifestations produces a considerable therapeutic effect. Suggestion is used in the treatment of certain forms of neuroses, particularly hysterical reactions, and in control of narcomanias, most commonly of alcoholism and smoking.

In addition to mental and nervous clinics, suggestion is also effectively used in other clinics—in the obstetric clinic to relieve labour pain and in the clinic for skin diseases to treat so-called neurodermatitides. Hypnosis is likewise used in clinics of internal diseases to treat early stages of hypertensive vascular disease, and a number of other diseases.

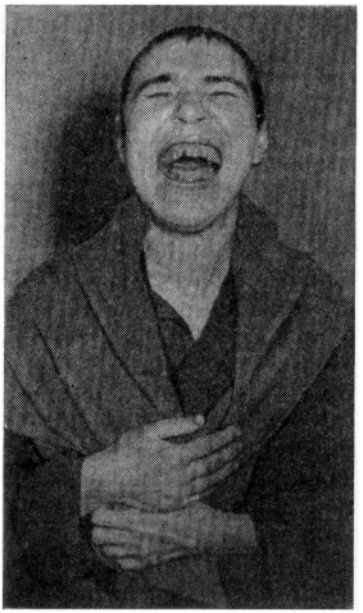

Fig. 69. Oligophrenic patient

OLIGOPHRENIA

This group of diseases includes various degrees of mental underdevelopment (from Gr. *oligos*—little and *phrēn*—mind+ia.)

In addition to mental retardation, oligophrenic patients nearly always exhibit physical underdevelopment. Oligophrenics are divided into morons, imbeciles (Fig. 69) and idiots, depending on the degree of their feeble-mindedness. This division is conditional since it is not always possible to draw a clear line between these groups. The mildest grade of mental deficiency is *moronity*, the intermediate grade—*imbecility*, and the severest grade—*idiocy*. Each group may contain patients considerably differing from each other in their mental state. For example, a comparison of patients with a mild degree of moronity with patients of the same group but standing closer to imbeciles in their mental deficiency will show a considerable difference in their mental faculties.

Moronity. Persons afflicted with moronity exhibit low mental ability. Many of them may attend regular schools, but, as a rule, they learn with great difficulty and are left back in one grade several years on end. In such cases it is more expedient to train them in special schools, according to a special curriculum.

Morons experience the greatest difficulties when they have to display resourcefulness and ability to reason. At the same time they may easily memorize verses and prose excerpts. As a result the patients may acquire a certain range of knowledge which enables them to work in production. Morons usually fail to understand the finer aspects of the relations between the people around them. They cannot gain an insight into the essence of their surroundings. That is why their statements are often out of place and sometimes cause of derision.

Morons have difficulty in operating with abstract concepts, their thinking never going beyond the bounds of the concrete. They are not critical of themselves. Many of them overestimate their potentialities and take serious offense when reproved. Some morons are highly suggestible. Finding himself under the influence of antisocial elements a moron may easily become an accomplice in a crime. Under proper social conditions morons adapt themselves to life's requirements and work in various simple branches of production. However, they are incapable of suggesting anything new or introducing any improvements into their work. Sometimes, against the background of general mental retardation, morons exhibit special aptitudes, as for drawing, singing, mechanics, etc.

Imbecility. Compared with morons the vocabulary of imbeciles is greatly limited. Imbeciles learn only the designations of the surrounding objects and the most commonly used words. They are often observed to have considerable speech defects.

Attendance of regular schools by imbeciles is out of the question, and they are therefore organized in special groups. Sometimes it is possible to teach them reading and elementary counting, but many of them cannot even count the fingers on their hands. It should be noted that imbeciles exhibit mainly a concrete type of thinking. For example, taught to count on his fingers or some other things an imbecile is incapable of solving the same problem without them. One patient could count the fingers on his hands, but asked how many toes he had he always tried to take his shoes off to count them. Such rules of arithmetic as division and multiplication are particularly difficult for imbeciles.

Imbeciles may be taught to do some simple work, but they must always be controlled and supervized. In a certain workshop

an imbecile had been taught to carry finished products from the machines to the storeroom. When seen several months later, he said with a feeling of great satisfaction that he could now not only carry the things to the storeroom, but also load them on a lorry. Emotionally imbeciles can be divided into two groups.

One group consists of patients who are mainly in high spirits, good-humoured and obedient. The other group consists of predominantly irritable, depressed and aggressive patients.

Idiocy. These patients are speechless. They can utter only inarticulate sounds and very rarely separate words. They cannot be taught any skills, are incapable of using household utensils and cannot even learn to use a spoon.

Idiots often fail to distinguish between edibles and inedibles and put into their mouths everything that comes into their hands. They are unpleasant, often fail to recognize their relatives and other people in their surroundings, and do not become attached even to those who continuously care for them. Many of them do not react to any acoustic or optic stimuli. In cases of pain they exhibit fits of rage, begin to scream and bite; sometimes they bite themselves. Their movements are few and monotonous; for example, they may sit in bed and rock to and fro for hours on end. Idiocy is particularly frequently marked by various physical deformities, for example, anomalies of cranial structure (abnormally small or abnormally large). It is often accompanied by polydactyly (supernumerary fingers or toes) Anomalies of internal organs are also frequently observed. Idiots very commonly exhibit various endocrine disorders, for example,

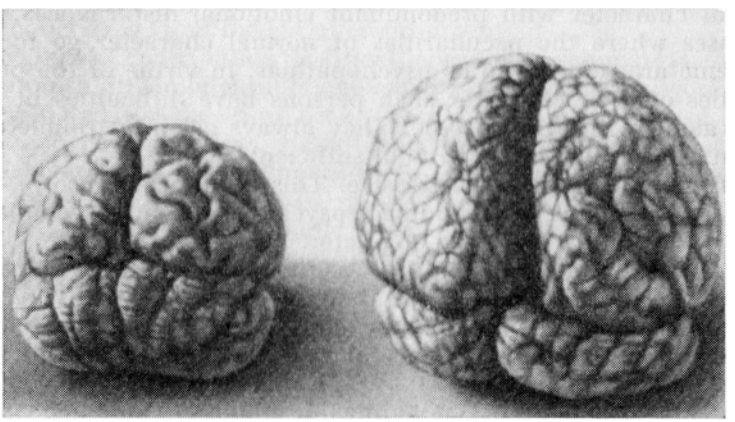

Fig. 70. Left—brain in oligophrenia, right—normal size of brain

underdevelopment of the thyroid. Owing to their physical inferiority they readily succumb to various diseases (infections, etc.).

Etiology. The causes of oligophrenia vary. The condition is most commonly the result of intrauterine infection with some infectious disease (syphilis, typhus, etc.). Of great importance to the appearance of oligophrenia is the virus causing rubella, toxoplasmosis. Some importance is attached to the parents' addiction to alcohol.

Diseases, such as meningitis and encephalitis, affecting the child in the first years of life may lead to mental retardation. Head injuries during or after birth are often responsible for retarded cerebral development (Fig. 70).

Treatment. First of all it is a question of preventing oligophrenia. If the child is developing a disease that may lead to oligophrenia, it is very important to give the child proper and timely treatment. In cases where the development of the brain is already retarded all measures must be aimed at requisite training (development of labour skills, instruction in a special school). Repeated courses of treatment with vitamin B_{12} and glutamic acid are conducted.

Care. In severe cases of idiocy and imbecility it is necessary to watch the patients' diet and toilet. Efforts must be made to teach the patients the simplest skills (dressing, undressing, etc.).

PSYCHOPATHIAS

Psychopathias are not related to psychoses. They are anomalies of character with predominant emotional disturbances.

Cases where the peculiarities of normal character go to the extreme are referred to as psychopathias. In virtue of the peculiarities of their character such persons have difficulties in getting along with other people. They always get into trouble and often exhibit fits of rage without sufficient reason.

Psychopaths may be aggressive. This is often a cause of torment to the people surrounding a psychopath; some psychopaths are tormented by their own character.

The concept of psychopathias was first suggested by I. Balinsky in 1884. He maintained that there were people who had no psychosis and yet could not be considered normal; he named these people psychopaths. Several years later this idea was supported and further developed by V. Kandinsky.

In the origin of psychopathias I. Balinsky attached great importance to the faulty organization of the nervous system and to the person's external environment.

S. Korsakov held that some part in the development of psychopathias was played by hereditary factors, addiction of the parents to alcohol, affection of the embryo and a number of other factors. He also attached definite importance to the surroundings. He believed that psychopathias had definite causes and were not something laid down once and for all.

The theory of psychopathias still has many unclear aspects. It is very difficult to classify the psychopathias. There is no generally accepted classification of psychopathias as yet.

In the beginning of the 20th century the German psychiatrist E. Kretschmer made an attempt to divide all human characters into groups which he connected with somatic peculiarities of body structure. He classified people into three groups: asthenic, pyknic and athletic. According to his classification the asthenics had a schizoid character, the pyknics—a cycloid, and the athletes—an epileptoid character. Intensification of the character traits on the basis of quantitative changes alone may, according to Kretschmer, lead to development of, for example, schizoid psychopathia.

Further quantitative changes may cause development of a disease—the schizophrenic reaction. Kretschmer believed psychopathias to be hereditary and independent of the external environment.

Kretschmer's proposition was severely criticized by I. Pavlov who pointed out that Kretschmer did not understand the transition from quantity to quality. Disease is not mere quantitative changes of some aspects of the personality, but is a qualitatively different state. I. Pavlov regarded as a great fallacy Kretschmer's biologization of a number of states which were conditioned by factors deriving from the social environment.

A valuable contribution to the theory of psychopathias was P. Gannushkin's monograph published in 1933. In this work he substantiated for the first time the dynamic principle of approach to psychopathias. He attached particular importance in the development of psychopathias to the external environment, especially the social factors.

In later years the dynamic concept of psychopathias was deepened and developed by Y. Krasnushkin and O. Kerbikov.

As was already mentioned, there is no generally accepted classification of psychopathias. Below we shall consider the most common forms of psychopathias.

Excitable Psychopaths. The psychopaths of this group are characterized by increased excitability. They may become excited on the slightest provocation. In such cases they are not fully responsible for what they do, may be aggressive and readily pick

fights. At such moments their actions are determined mainly by their emotional state. During calm periods the psychopaths of this group are capable of critically evaluating their behaviour and do all they can to make up for their lapses. These psychopaths have weak internal inhibition.

Asthenic Psychopaths. These are people in whose character anxiety and doubt predominate. These people are diffident and constantly doubt the correctness of their acts and deeds. Sometimes they think they are being laughed at. They are timid, shy and readily blush, which embarrasses them still more.

Many of them seek seclusion and avoid company. They feel particularly awkward when they have to take part in social activities (meetings, lectures, talks, etc.). In difficult situations which require certain effort they become frightened and easily relinguish their aims.

Pathophysiologic examination reveals that asthenic psychopaths have weak basic nervous processes, for which reason passive inhibition easily develops.

Emotionally Labile Psychopaths. This group consists of psychopaths with various emotional instabilities. High spirits may predominate in some, low spirits to the point of deep melancholy—in others, and frequently alternating moods—in still others, the moods being scarcely connected with the external environment in any of the cases.

Some psychopaths exhibit various sexual perversions; these include *homosexuality*—sexual attraction to members of one's own sex, *sadism*—sexual gratification derived from inflicting physical pain upon the sex partner, and *pedophilia*—sexual attraction for children.

In diagnosing psychopathia it should be remembered that psychopathic manifestations may be due to various causes. For example, if a person survived encephalitis or sustained a head injury when young, he may develop various emotional and volitional disorders. His behaviour may resemble that of a psychopath, but this is not psychopathia. Psychopathias, as was already mentioned, are based on some inborn pathologic characteristics of the nervous system, which, depending on the environment (upbringing), may manifest themselves very vividly or remain unnoticed. If the nervous system has no inborn pathologic characteristics and the conditions of upbringing are such that they lead to psychopathic manifestations, it is a matter of educational negligence.

A correct evaluation of the aforesaid states is not only of theoretical importance, but is also of practical expedience.

P. Gannushkin's prediction that improved social conditions

will lead to a decrease in the incidence of psychopathias has come true.

Treatment. Prophylactic measures are of particular importance. As soon as traits of psychopathic character are observed in a child, measures must be taken to set up an appropriate regimen. It is also very important to place the child in a group where the child will acquire social habits. In more difficult cases the patient has to be placed in a psychoneurological institution. In out-of-town mental hospitals it is sometimes advisable to keep these patients on a strict regimen, including a good deal of work.

PRINCIPLES OF ORGANIZATION OF NEUROPSYCHIATRIC AID IN THE U.S.S.R.

In the U.S.S.R. considerable attention is devoted to organizing medical aid for the entire population. Every branch of medicine has a central administration in the republican ministries of health and in the Ministry of Public Health of the U.S.S.R. This also applies to organization of specialized neuropsychiatric aid. Every republican ministry of public health has a department of neuropsychiatric aid, which supervises all the practical and theoretical work in neuropsychiatry in the republic. In the Ministry of Public Health all these problems are dealt with by a department of specialized aid.

The neuropsychiatric institutions include special hospitals (for inpatients) and dispensaries (for outpatients).

Neuropsychiatric Dispensaries. Every district of a large city has a neuropsychiatric dispensary headed by a district psychiatrist. Every district is in its turn divided into divisions, each having its own psychiatrist, working in this dispensary. The patients apply to neuropsychiatric dispensaries themselves (or with their relatives) or are referred to them by physicians from polyclinics, outpatient clinics, etc. The work of neuropsychiatric dispensaries includes prophylaxis and treatment, social and legal aid, and evaluation of working capacity.

The dispensaries administer the necessary *prophylactic and therapeutic aid* to patients both on location and at home. The essential difference between the work of these dispensaries and regular polyclinics is that the former keep active records of every applicant showing any signs of mental disease, i.e., if the applicant fails to report for re-examination, he is visited at home by the district psychiatrist who administers the requisite treatment or refers him to a hospital.

The work of the dispensaries is closely linked with that of mental hospitals. In the event the patient was admitted to a hospital without going through a dispensary, all necessary medical information is forwarded, upon the patient's discharge, to his local neuropsychiatric dispensary and the patient is thus put on record. In addition to the essence of the disease and the treatment given, the forwarded documents usually contain recommendations for further observation, dispensary treatment or employment of the patient.

The dispensaries thus keep records of all mental patients. This is a very important point since, by continuously observing the patients, the dispensary psychiatrists can discover any changes in their health in good time and take corresponding measures. The physician's assistant or nurse who periodically attends on the mental patient sees the patient very often and usually obtains from his relatives and neighbours important information concerning the changes in his condition. This information is very important for evaluating the patient's condition and helps to decide in good time on his further treatment. The dispensaries provide treatment mainly for patients who exhibit no acute psychotic symptoms, most commonly patients with chronic forms of mental diseases, epileptics with infrequent seizures, patients with cerebrovascular diseases or residual phenomena following cerebral injury, neurotics, etc.

In addition to drug therapy, psychotherapy and physiotherapy, occupational therapy is extensively conducted in special shops of the dispensaries. Occupational therapy plays a particularly important part for patients who after surviving a mental disease retain certain after-effects. In the occupational therapy shops the patients do simple work under supervision of special instructors. The patients are under constant observation of a physician and a nurse. As the condition of such patients improves, they either return to their jobs or acquire simpler skills. Under the prevention programme the dispensary physicians and nurses carry on health education work among the patients and their relatives, at industrial enterprises, various institutions, etc.

The dispensaries give their patients *social and legal aid*, helping them as regards employment and other day-to-day problems. If the patient is on pension, the dispensary sees to it that he is re-examined by the VTEK (Medical Expert Commission for Evaluation of Working Capacity) in due time. It also takes part in establishing guardianship and appointing a guardian to protect the rights and interests of incompetent mental patients. Outpatients are under constant observation of physicians and nurses who visit them at their homes. The dispensaries keep

special records of the patients so attended. Outpatients are visited by specially appointed public health nurses.

The dispensaries take part in evaluating the working capacity of their patients. In cases where a particular question cannot be settled by the dispensary the patient is hospitalized, additional data are obtained and the question is decided by a medical expert commission of the hospital.

Regional dispensaries carry out prophylactic measures and administer therapeutic aid to the population on a district principle, physicians and their assistants periodically covering the different districts. The regional dispensaries, like those in the cities, are in contact with the district hospitals and rural district physicians. This brings medical aid closer to outpatients and helps to keep the patients under systematic observation.

Aid in Mental Hospitals. The first to be placed in a hospital are patients whose mental condition constitutes a hazard either to themselves or the people around them. The former are patients in a depressive state who often harbour suicidal thoughts, patients with presenile psychosis, certain schizophrenics, patients with delirium tremens. It is extremely dangerous to keep such patients at home. Patients with delusions of persecution, poisoning and physical influence, as well as epileptics in a twilight state, and certain other patients often constitute a hazard to the people around them. Moreover, the hospitals also admit patients who are in need of treatment which can be administered only in hospitals, for example, insulin shock therapy.

Usually patients are admitted to hospitals on recommendation of district psychiatrists, although in urgent cases patients may be admitted on recommendation of any physician or without any recommendation at all. The physician on duty always receives and examines the patient being admitted. The patients are examined in the reception ward. In addition to the psychoneurological examination, the physician takes the patient's temperature, examines his throat, auscultates his heart and lungs, etc. It is not always possible to examine patients so thoroughly in severe mental cases (extreme negativism, excitement). Special attention is devoted to the physical examination of the patients, for which purpose the patients are completely undressed in a special examination room. In cases where abrasions, ecchymoses, dislocations or other bodily injuries are found it is necessary most carefully to record them in the case history otherwise conflicts may subsequently arise either with the patients' relatives or the patients themselves who may accuse the hospital personnel of inadequate or improper care. In the reception ward the patients' personal effects (clothes, etc.) are taken away and

are checked in the storeroom; after a bath the patients are given hospital clothes (pyjamas and a robe). It is absolutely prohibited for the patients to take into the ward any sharp or pointed objects—razors (even safety razors), penknives, forks, needles—glassware, medicines, etc. After medical examination the patients are placed in corresponding wards.

One of the main principles of distribution of patients in mental hospitals is that of severity of their condition. Every hospital has *divisions for unquiet* (so-called acute) *cases* and *divisions for quiet cases.*

The divisions for unquiet cases admit patients requiring strict surveillance and special care. These include excited patients, patients in a depressive state, patients inclined to destructive actions, attacks against those around them, attempts at escape.

It is desirable that these divisions should be on the lower floors of the hospital buildings. These divisions must be adapted to maintenance of unquiet patients. The window-frames and transoms must be secured by special locks and the keys kept out of the patients' reach. The window-panes should be unbreakable and the framing close. The windows must have no curtains or blinds. The electric wiring must be enclosed. The radiators should be placed in deep recesses and covered with a wire mesh. If the hospital is heated by stoves, they must be fired outside the wards. There should be no nails, hooks or strings from the ventilation system, etc., on the walls. Nor should there be any superfluous furniture in the divisions. The beds must have no sharp projections, must have low head- and foot-boards, must be heavy and impossible to dismantle without tools. The exits from the divisions should always be locked, each member of the staff having keys.

Only metal (alluminium) utensils are allowed, and the patients are not given any forks or knives. Nor should the patients be given any scissors, razors, needles, pens, long pencils and other cutting and prickling objects.

Each division has several wards so that even within the division for unquiet patients the latter can be distributed according to their condition. For example, there is always a so-called observation ward for patients requiring particularly strict surveillance and care, or for patients whose condition is undetermined (large hospitals have special reception divisions for such patients). One or two attendants are on duty in the observation ward 24 hours a day.

There are special wards for insulin therapy. There is also a ward (or division) for semi-quiet patients. The doors of these wards must be kept open.

The division for unquiet patients must have a separate garden for promenades (the garden communicating directly with the division). The garden must be surrounded by a high fence. Hospital attendants must be present in the garden during the promenade hours so that the patients may be closely watched.

The division for quiet cases admits patients with regular and orderly conduct, for which reason the arrangement and equipment of these divisions scarcely differs from those of ordinary hospitals. These divisions accommodate patients with neuroses and initial manifestations of cerebrovascular diseases, as well as convalescents transferred from the divisions for unquiet cases after the end of treatment.

A special division is reserved for mental patients with severe somatic diseases. Such divisions are sometimes set up in large somatic hospitals. These divisions accommodate patients requiring constant care in view of their grave physical condition, for example, patients in the terminal stages of cerebral arteriosclerosis, with severe paralyses, physically debilitated by senile psychoses, etc. These divisions have isolation wards for patients suspected of infectious diseases.

Large mental hospitals have children's divisions organized strictly according to age categories and sex. These divisions employ teachers so that the children long confined to the hospital are given requisite schooling.

Psychiatric dispensaries organize daytime hospitals, i.e., therapeutic and prophylactic institutions in which the patients stay during the daytime and go home for the night. The patients are transferred to daytime hospitals for the purpose of building up their health after the end of treatment in regular hospitals; some patients are admitted to daytime hospitals from dispensaries. In addition to drug treatment and physiotherapy, the daytime hospitals make wide use of occupational therapy.

Each mental hospital must have a clinical laboratory for blood, cerebrospinal fluid, urine and other analyses, a biochemical laboratory, installations for roentgen diagnosis and roentgen therapy, a physiotherapeutic department, facilities for electrocardiography and a special room for electroencephalography.

All the deceased must without fail be subjected to a postmortem examination in the specially equipped dissecting room; for more thorough-going examinations it is desirable to have a histopathological laboratory.

For more extensive utilization of occupational therapy in the treatment of patients with chronic forms of psychoses psychiatric colonies, i.e., out-of-town neuropsychiatric hospitals, are set up. These institutions are organized and equipped in a man-

ner that allows them to carry out extensive therapeutic measures, examine the patients, etc. Since these colonies are usually located in rural areas they devote considerable attention to occupational therapy (vegetable growing, gardening, work on cattle farms, etc.).

Moreover, they have various occupational therapy shops (joiner's, tailor's, shoemaker's, cardboard article and other shops).

Prolonged treatment in a colony (months or even years) leads in a certain percentage of cases to considerable improvement in the health of the patients so that they often return to their families and work.

For the treatment and amelioration of the health of patients with mild neuropsychic disturbances which constitute no hazards for those around them there are neuropsychiatric sanatoriums.

The sanatorium regimen favours restoration of the patients' working capacity and prevents development of their diseases to graver stages.

Owing to the extensive network of neuropsychiatric institutions which are doing active therapeutic and prophylactic work the U.S.S.R. has achieved considerable success in the treatment of mental patients. A certain percentage of the patients is discharged from hospitals cured or considerably improved.

MENTAL HYGIENE AND PSYCHOPROPHYLAXIS

Mental hygiene is the branch of hygiene dealing with the preservation of man's mental and emotional health. It is closely linked with the hygiene of everyday life and work. Only since the Revolution has it become possible to carry out a comprehensive programme of mental hygiene in our country. The state provides for labour protection and adequate rest (vacations and recreation) for all of the country's working people. Public welfare is the highest law of the Communist Party. In the Soviet country the working people have all the conditions necessary for creative, constructive and joyful labour. The peoples of the Soviet land are sure of their future since their future is in their own hands.

The Communist Party and the Soviet Government display unwearying concern for the well-being of the people. The steady growth in their material and cultural level is a vivid proof of this concern. The medical services are constantly improving and the network of sanatoriums and holiday-homes is expanding

with each passing year with the result that morbidity and mortality are steadily decreasing.

Health education of the population is one of the important measures of mental hygiene. Special houses of health education are continuously increasing. Mass editions of popular science pamphlets are published, popular science films are demonstrated, etc. All these measures raise the cultural standards of the population with the result that the people sooner apply for medical aid, which undoubtedly favours better prognosis. It is perfectly clear that mental hygiene very greatly contributes to prevention of mental diseases (psychoprophylaxis). Proper organization of the regimen (work, rest, recreation, diet, exercise) of the masses of people serves to prevent not only disease in general, but also mental disease.

It is important correctly to organize the teaching process by appropriately arranging the schoolchildren's time (work, rest and recreation) with due regard for their age characteristics.

The mass measures for the control of children's infections carried out in nurseries, kindergartens and infant health centres in the form of preliminary inoculations play an important part in preventing nervous and mental diseases.

The successful control of venereal diseases has also been an important factor of psychoprophylaxis. Suffice it to say that general paresis, widespread before 1917, is a very rare occurrence today.

Free dispensary services and systematic observation of all mental patients are conducive to early detection of any aggravation of their condition and facilitate the carrying out of requisite medical measures. The provision of dispensary aid for the population in general and industry in particular, as well as the prophylactic examinations of industrial and office workers who have anything to do with industrial poisons, ensures detection of early, incipient forms of nervous and mental diseases.

MANAGEMENT OF MENTAL PATIENTS

The work of the medical personnel in mental institutions differs greatly from that in the other hospitals, and has its own specific features. These features are conditioned mainly by the fact that many patients are not aware of their morbid state and some patients do not consider themselves ill at all. Moreover, some patients with consciousness disorders often exhibit extreme motor excitement. The medical personnel of mental hospitals must therefore exercise constant vigilance and self-control, be patient, sympathetic, gentle and resourceful and have

a strictly individual approach to each patient. Good teamwork of the entire personnel of the division and the hospital is also very important.

Knowledge of all the details of managing, supervising and attending to mental patients is a *sine qua non* in the work of a nurse and physician's assistant in a mental institution. These questions are dealt with in the present chapter. To begin with, we must dwell on the conduct of the personnel in the division and the personnel's attitude to mental patients.

Firstly, the nurse must know every patient in the division; she must know not only each patient's first and last names, the ward and bed occupied by each patient, but also each patient's current mental state; she must also know the number of patients in her division, which of the patients happen to be out of the division at any given time and for what reason. She must devote particular attention to patients needing special surveillance and care.

The nurse gets this information during the physician's rounds of the division, from the nurses' journal, at the short daily meetings of the personnel, etc. Secondly, the nurse must have precise knowledge of all of the physician's prescriptions and must strictly carry them out at the specified time.

The medical personnel must treat the patients seriously, politely, affably and sympathetically. It is profoundly erroneous to think that the patients do not understand or appreciate this. However, the personnel must not go to the other extreme, i.e., be excessively soft and sugary and talk to patients as if they were so many babies, because this may irritate and upset them. The staff must show no preference for some patient and neglect others. The patients are quick to notice this and to become rightfully displeased.

The personnel must maintain a business-like atmosphere in the division, must see to it that the regimen is observed and must refrain from talking loudly because quiet is a very important and necessary condition in the treatment of nervous and mental patients.

The medical personnel must be neat and trim in appearance. Their robes must be clean, well-pressed and completely buttoned. The head must be covered with a white kerchief, all the hair tucked under it. Men are advised to wear a white cap. During work the personnel must not wear necklaces, earrings, brooches or other ornaments when they have to hold excited patients because the latter may tear them off.

In cases where patients begin to exhibit motor or speech excitement, or if any sharp change in their condition is observed,

the nurse must urgently notify the attending physician or the physician on duty. The intermediate medical personnel is not allowed to prescribe medicines or procedures, or transfer patients from one ward to another or even from one bed to another.

Discussion of outside matters in the presence of patients is prohibited even if the patients are totally indifferent to their surroundings. Sometimes, patients tell the physicians after the course of treatment that the nurses or attendants discussed extraneous matters in their presence, that they were extremely distressed by these discussions but could do nothing about it since they were unable to move or speak (the patients were in a catatonic stupor). Such discussions of outside matters are no less distressing to patients in depressive and melancholy states. Patients with delusions of reference or guilt often apprehend in these discussions a number of "facts" which in their opinion have a direct bearing on them. This may increase the patients' anxiety and sever their contact with the medical personnel. Such patients begin to suspect the nurse and refuse to take medicine from her; in these cases it is said that the patients bring those around them into their delusions.

The personnel must not discuss in the presence of patients the disease or condition of any patient, must not make any prognosis, etc. It is absolutely prohibited to ridicule any patient or talk to him in an ironical and playful manner.

The patients with delusional ideas not infrequently suggest various reasons for their confinement, complain that they are not being treated correctly and allege that everything is being done to get rid of them, put them to death, etc. In these cases the patients must be heard out attentively and patiently. It is not necessary to dissuade the patients at all costs, nor must the nurse agree with their delusional statements. In these cases it is most commonly necessary to tell the patients that their assumptions are wrong, their apprehensions are entirely ungrounded, and they must undergo treatment because they are ill. As a rule, this does not satisfy the patients and they immediately ask about the date of their discharge from the hospital. They must be advised to ask their attending physician, because it is usually very difficult to set the date of a mental patient's discharge since his treatment may require additional time or his condition may change for the worse. Only an approximate date may be mentioned so as to give no grounds for future arguments or conflicts. The date may be definitely stated only a few days before the discharge.

Sometimes, to calm the patient, some member of the medical personnel promises a patient an out-of-time visit of a relative, a telephone conversation, etc., but fails to keep his promise, i.e., deceives the patient. This must under no circumstances be done because the patient loses all confidence in those around him. In the event a patient's question cannot for some reason be directly and concretely answered, it is best to try and switch to another subject, divert the patient's attention, etc. Nor is it advisable to place the patient in the hospital by a rule because this renders the future contact with the patient difficult, the patient long mistrusts the people around him, does not tell anything about himself or his problems, sometimes becomes embittered against the personnel.

The patients do not have to be feared; nor is there any need for useless bravery, because it may lead to grave results. The following may serve as an example attesting that association with patients requires caution. During reception in the physician's office a patient who was in a delusional state asked an inexperienced physician to come out into the corridor for a confidential talk. Everything in the patient's behaviour indicated his delusional attitude to the physician. The patient and physician (contrary to the advice of the other people present in the office) went out into the corridor where the patient immediately assaulted the physician.

The possibility of sudden (impulsive) aggressive acts of patients against the personnel or other patients must never be overlooked. On the whole, however, aggressive acts of patients against the medical personnel are rare; the medical personnel must under no circumstance take offense and become embittered against the patients for their aggressive intentions or acts since these intentions and acts are connected with their disease. Upon recovery patients often beg forgiveness for their past conduct.

In the event of a quarrel or fight among patients the nurse must take urgent measures to separate them (for which purpose she must call attendants) and immediately notify the physician. No patients must be blamed or exonerated in the presence of other patients.

The patients often make various requests of the personnel. Many of them are quite grantable. But before granting any request it is necessary to consider the possible results, i.e., the personnel must exercise caution. For example, a female schizophrenic with delusional ideas of physical influence and poisoning began to feel better after a course of treatment, although her delusion did not fully disappear, which she carefully con-

cealed (dissimulated). In the evening she asked the nurse for a safety pin to draw an elastic through the belt of her undergarment. The nurse let her have a pin. The physician summoned soon afterwards found the patient to have injured her face by trying to pin up her mouth so that nobody "might open it at night and pour poison into it".

The patients often write all sorts of letters, applications and complaints to various institutions, describing their "tortures" and asking to be examined by a commission, etc. To prevent such applications from leaving the hospital, all letters written by patients must be read by either the physician or the nurse. Letters of a clearly morbid character or containing incongruous statements must not be mailed and must be handed over to the physician. The letters and notes coming into the division must also be read before being handed to the patients in order to safeguard the patients against any traumatic news which may aggravate their condition. All parcels brought into the hospital must also be examined in order that the patients' relatives or friends may not intentionally or unintentionally bring in anything contraindicated or even dangerous, for example, drugs (especially narcotics), alcoholic liquor, needles, razor blades, pens, matches, etc.

The nurse must be thoroughly familiar with all the duties of the attendants, must watch their work, and remember that no attendant must be removed unless he is simultaneously replaced. The new shift of attendants coming on duty must be instructed by the nurse as regards the patients requiring strict surveillance, special care, etc. These are most commonly patients in a depressive state, patients with hallucinations and delusions, especially with delusions of physical influence and persecution, epileptics with frequent seizures or periodic attacks of consciousness disorders, physically debilitated patients refusing food, and certain others. The greatest possible vigilance and strict surveillance are the best way to preclude accidents (suicide, self-torture, escape, assault against persons surrounding the patients, etc.). The attendants must always keep an eye on these patients. If a patient with suicidal tendencies pulls the blanket over his head, the attendant must uncover his face because there have been cases when the patients attempted suicide under the blanket. When taking the patient's temperature it is necessary carefully to watch that the patient does not hurt himself with the thermometer or does not try to swallow it in order to commit suicide. When a patient goes to the toilet the attendant must watch him through the peep-hole, etc. The surveillance must not be relaxed day or night; the wards where such patients

are usually placed (observation wards) must have adequate lighting at night.

When dispensing medicines the nurse must not leave the patient until he has swallowed it because some patients, who for some reason or other do not want to be treated (delusional interpretation, fear, negativism) upon receiving powders or pills throw them out or accumulate them in order to take a large dose and thus commit suicide. If any patient is suspected of this, it is necessary to examine his bedding and personal effects; incidentally, it is advisable to do this from time to time with respect to many patients. To avoid offending the patient, his things must be examined either when he is out promenading or taking a bath. In the event it is urgently necessary to examine a patient's things the patient is instructed to take a bath or invited into the physician's office.

Suicidal or demented patients sometimes collect pieces of glass or metal, nails, etc., during promenades in the garden. The attendants must therefore carefully watch them during promenades. The garden must be kept thoroughly clean.

The patients must not be allowed to have matches. The matches for smokers must be kept by the attendant. The latter must see to it that the patients do not throw lighted cigarettes on their beds or burn themselves, which patients sometimes do in a depressive or delusional state.

The patients must not be allowed to have long pencils, penknives, hair-pins, etc.

The patients must be shaved by a barber in the presence of the attendant; the barber should preferably use a safety razor. These precautions are necessary because sometimes patients snatch the razor out of the barber's hands and severely hurt themselves with it. The patients are not given any forks and knives to eat with. The food is prepared so that it may be eaten with a spoon. The pantry where the knives and other sharp things are kept must always be locked. The patients must be forbidden entrance to the pantry.

As a rule, there are some helpless patients who are in need of systematic care. This group includes patients in catatonic and depressive stupor, patients with severe (coarse) organic cerebral lesions, exhibiting paralyses and extreme dementia, physically debilitated patients, etc. Often they cannot eat unassisted and must be fed and given to drink from a spoon. Physically debilitated patients, as well as patients with dysphagia, must be given liquid food in small portions and slowly, or else they easily choke. The patients' beds and linen must be kept clean, for which reason a bedpan must be periodically placed under

each patient. To move the bowels, the patients are given cleansing enemas. The patients who are allowed to get out of bed must be taken to the toilet. In cases of urinary retention (most commonly observed in catatonics) the urine must be drained through a catheter. It is necessary carefully to examine (at least once or twice a week) the patients' skin because they readily develop bedsores and intertrigo (chafing). Particular attention must be paid to the sacrum and buttocks. On the appearance of the first signs of bedsores—persistent redness of the skin—the patient must be placed on a rubber ring and his skin systematically rubbed down with camphorated alcohol. The patient's oral cavity must be periodically rinsed, especially if the patient does not eat or drink, but is fed through a tube. The patients' hair must be kept clean (it is best to cut it short).

The personnel must devote particular attention to patients who refuse food. Patients may refuse to eat for various reasons —catatonic stupor, negativism, delusional ideas (poisoning, guilt), imperative hallucinations forbidding the patients to eat, etc. The personnel must try to find the reason for the refusal to eat in each individual case. Sometimes patients may be persuaded to eat. In other cases patients allow themselves to be fed only by a particular member of the personnel or a relative. Patients with negativism sometimes eat if the food is left at their side and nobody is watching. Administration of 10-15 u of insulin on an empty stomach often helps because it increases the sensa-

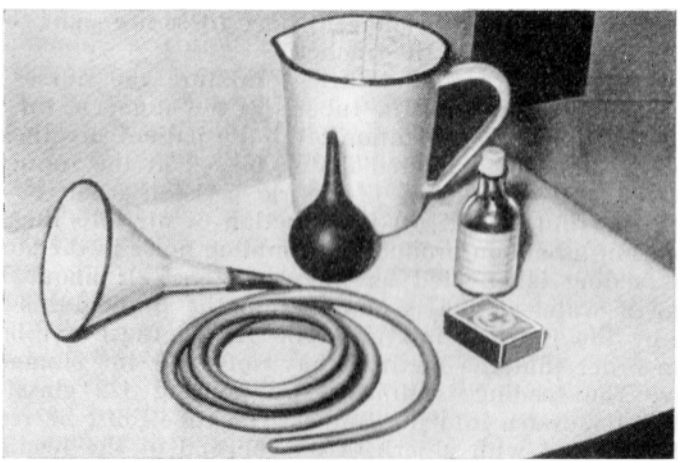

Fig. 71. Things required for feeding through a tube

tion of hunger. In a number of cases the personnel succeed in feeding the patient by overcoming his slight resistance.

If the patient cannot be prevailed upon, he must be fed through a tube, for which purpose the following equipment must be prepared: (1) a rubber tube (diameter of the opening—0.5 cm, one end of the tube is rounded and has two side openings, the other end is open), (2) a funnel, its narrow end fitting into the open end of the tube, (3) vaseline or glycerine to lubricate the tube before its insertion, (4) a nutrient mixture consisting of 500 g of milk, 2 eggs, 50 g of sugar, 20-30 g of butter, 5-10 g of salt, and vitamins (the mixture must be warm), (5) two glassfuls of boiled water or tea, (6) a clean rubber cylinder, (7) matches, and (8) a mouth retractor (Fig. 71).

When everything is ready the patient is placed supine on a couch. The patients usually resist, and to hold them therefore requires 2-3 attendants. The end of the tube is lubricated with vaseline or glycerine and is introduced into the patient's nose. Usually the tube easily goes through the nasal passage into the nasopharynx, the esophagus and the stomach; about 50 cm of the tube has to be inserted. During the passage of the tube through the nasopharynx the patient reacts with reflex vomiting movements; moreover, he tries to expel the tube. At this time the patient may temporarily hold his breath and strain, his face becoming flushed. In such cases it is best to close the patient's mouth and tell him to breathe through the nose and perform swallowing movements. If the patient develops respiratory difficulties, his face turns blue and his excitement increases, the tube must be quickly removed, since these are signs that the tube was introduced into the trachea.

Before administering the nutrient mixture the nurse must make absolutely sure that the tube is in the stomach, for which she has the following indications: (1) the patient breathes freely, (2) the flame of a lighted match placed at the funnel does not waver, and the sounds of gastric peristalsis can be heard through the funnel, and (3) introduction of air into the funnel by means of a balloon produces a rumbling noise in the stomach.

The feeding is effected as follows (Fig. 72): about half-a-glassful of water or tea is poured into the funnel; this is followed by the nutrient mixture. The funnel must not be held high in order that the mixture may not enter the stomach too rapidly. The feeding is finished by pouring 1-2 glassfuls of boiled water or tea into the funnel. The tube must be removed quickly, but not with a jerk. After the end of the feeding the patient must be held for a few minutes in the same position because sometimes he may make himself vomit. To prevent

Fig. 72. Nasal feeding

vomiting the patient is administered atropine (subcutaneously, 10-15 minutes before the feeding). Some patients must be fed through a tube for several months, and it is therefore necessary from time to time to examine their nasal passages.

In the event the tube cannot be introduced through the nose (deformation of the septum, polyps, etc.) it must be introduced through the mouth, but, to prevent the patient from compressing the tube with his teeth, it is first necessary to place a mouth retractor into the patient's mouth.

Considerable attention must be devoted to excited patients. The character of the excitement may vary. It may occur in such psychoses as the schizophrenic reaction (catatonic and hebephrenic excitement), the manic-depressive reaction (manic phase), as well as in delirious and amential states of various etiology. Drugs are the most important agents in the control of motor excitement; the drugs used include chloral hydrate (2-3 g), a 10 per cent hexenal solution (5-10 ml), a 25 or 40 per cent magnesium sulfate solution, amytal sodium (0.2-0.4 g per dose), pantopon. Good results are also produced by chlorpromazine which is administered intramuscularly as a 2.5 per cent solution (200-400 mg per day). Since patients in an excited state do not, as a rule, take medicines per os, the medicines must be administered subcutaneously, intramuscularly or per rectum by means of enemas or in suppositories.

Long-continued warm baths (35-36°C) are also very effective. In such baths, if there are no cardiovascular contraindications

Fig. 73. Excited patient held by two attendants

and warm water keeps flowing in, the patients may be kept for several hours on end.

Sometimes an excited patient has to be kept in bed until he has taken his medicine. The nurse must not only know all methods of restraining excited patients, but must also be able to show them to the attendants and when necessary to supervise them. Keeping an excited patient in bed may require one or two and sometimes up to five attendants, depending on the extent of the excitement. In cases of intense excitement the patients are placed supine in bed with arms and legs extended. Two attendants stand on each side of the bed, two of them holding the patient's arms, immobilizing the upper arms and forearms, the other two holding the legs, immobilizing the thighs and shanks. Sometimes two attendants are enough to hold the patient; in these cases one of them holds the patient's legs and the other the arms, first crossing them so that the left arm rests on the right (Fig. 73). If the excited patient tries to strike his head against something, or to bite, it requires a third attendant to immobilize the patient's head. To do this the attendant stands at the head of the bed and firmly presses the patient's head to the pillow with a towel placed on his or her forehead (Fig. 74). The attendants must be careful not to inflict any pain on the patients while holding them. It is therefore best to hold them through a sheet or blanket. No pressure must be applied to the patient's abdomen or chest for fear of causing pain or fracturing the ribs.

In the event the excited patient does not let anybody approach him by brandishing some weapon the attendants must approach him with an unfolded blanket held high in their arms. The blanket is thrown over the patient and the latter is immediately put to bed and held as described above.

When transferring an excited patient from one place to another it is also necessary to hold him properly. There are several ways of doing this, and they are employed according to the intensity of the excitement and the patient's strength. If the patient is conducted by one attendant, the latter must approach him from behind, hold his arms crossed and walk beside him. The patient may resist—try to break away or hit the attendant with his head. To prevent this, the patient's arms must be somewhat raised, thus weakening the movements of his shoulders and head. In cases of intense excitement the patient must be conducted by two attendants, each holding one of the patient's abducted arms (by the wrist and upper arm, just above the elbow).

In caring for epileptics it should be remembered that in view of their peculiar character they often enter into long conflicts with the other patients which may lead to aggression. The nurse must be able to divert such patients in good time and calm them. But if such a patient continues to be malicious and tense, it is necessary to notify the physician. In cases of dysphoria (mood disturbance) which may last several hours or days it is advisable not to contact the patient too often or try to get him to do

Fig. 74. Excited patient held by three attendants

anything because at this time the patient is extremely irritable and malicious. It is best to leave him completely alone (for aid and care during epileptic seizures see chapter on epilepsy).

Considerable difficulties sometimes arise in managing psychopaths who violate the rules of the division, quarrel with the other patients, etc. In these cases it is frequently necessary to resort to a strict tone to call such patients to order.

One of the essential duties of the nurse is keeping a diary in which she must record in simply and accurately all she sees in the course of the day while observing the patients. This diary, if well kept, is very helpful to the physicians because the nurse spends more time with the patients than do the physicians and sometimes may observe a number of very essential changes in their condition. The relieving nurses and attendants also need the diary to familiarize themselves with the condition of the patients. Only by efficient and coordinated work of the entire personnel of the division and correct organization of management and treatment can good results in aiding mental patients be achieved.

Glossary of Terms Most Commonly Used in Neuropathology and Psychiatry

Abscess, cerebral—localized collection of pus in the brain most commonly caused by penetration of pyogenic microbes in cerebral trauma and suppurative disease of the ears or lungs.

Absence—temporary loss of consciousness in epileptics.

Abstinence (withdrawal) syndrome—symptom complex of somatic and neuropsychic disturbances in narcomaniacs during the period of abstaining from narcotics.

Acalculia—loss of ability to count. Also called *arithmetic disability.*

Acousma—a simple auditory hallucination, as of buzzing, ringing, crackling, whistling, etc.

Acrocyanosis—blueness of the extremities.

Adequate—corresponding to the stimulus or situation; for example, happy countenance upon receipt of good news.

Affect—intense manifestation of feelings (rage, joy, etc.), as a rule accompanied by vegetative phenomena (blushing, pallor of the face, etc.).

Affect, pathologic—differs from usual affect in that it involves disordered consciousness.

Agraphia—loss of ability to write.

Agrypnia—sleep disorder, insomnia.

Alexia—word blindness; inability of the patient to recognize or comprehend written or printed words.

Alzheimer's disease—presenile sclerosis.

Amaurosis—blindness.

Amential syndrome—a form of disordered consciousness characterized by extreme confusion, total disorientation, fragmen

tary hallucinations, fragmentary speech and motor excitement (usually in bed).

Amimia—loss of power of expression resulting from paralysis of the facial muscles, the patient having a masklike countenance.

Amnesia—loss of memory, forgetfulness of various periods of the patient's life.

Amnesia, anterograde—loss of memory for the period immediately following the onset of the disease.

Amnesia, retrograde—loss of memory for events which occurrred before the onset of the current disease.

Amnestic syndrome (*Korsakov's syndrome*)—sharp defects in retention and recollection of current events. and confabulation or pseudoreminiscences.

Analgesia—insensibility to pain.

Anesthesia—lack of sensation.

Anisocoria—inequality in the diameter of the pupils.

Anorexia—absence of appetite.

Anosmia—absence of the sense of smell; the patients cannot distinguish any odours.

Aphasia—loss of speech in organic affection of the brain.

Aphasia, amnesic—loss of memory for specific words, the patient being unable to name familiar things, although retaining the knowledge of their purpose. For example, when shown a key, the patient cannot name it, but says that it is the thing with which locks are secured and undone, and makes rotatory movements with the key.

Aphasia, motor—the patient cannot speak, although he understands the speech of others.

Aphasia, sensory—the patient can utter words and phrases, although he does not understand the speech of others.

Aphonia—voicelessness; not infrequently observed in hysteria.

Apoplectic stroke—cerebral hemorrhage.

Apraxia—inability to perform purposeful movement, although no muscular paralysis is present, the patient being unable to light a match, dress, etc.

Areflexia—absence of reflexes.

Argyll Robertson's sign (*Argyll Robertson pupil*)—pupils react to accommodation and convergence, but not to light; often seen in tabes dorsalis and general paresis.

Astasia-abasia—inability to stand or walk, not accompanied by organic affection of the central or peripheral nervous system. Examination of the patient in bed shows all movements in the legs to be intact.

Asthenia—general debility, lack or loss of strength. Often observed after an infectious or other severe somatic disease.

Ataxia—incoordination of muscular action.

Atonia—absence of tonus.

Aura (breeze)—symptom observed in the beginning of an epileptic seizure. Various forms of aurae are distinguished—vegetative, sensory, etc.

Autism—withdrawal from the surroundings and morbid concentration on oneself; the patient is difficult to make contact with.

Axon (*neurite, cylinder process*)—efferent process of a nerve cell arising from the base of the cell.

Babinski's sign—found in disturbances in the pyramidal tract and normally observed in infants up to 1 year of age.

Bulbar paralysis—paralysis due to degenerative changes in the nuclei of the cranial nerves located in the medulla oblongata and showing all signs of peripheral paralysis.

Bulimia—excessive, insatiable appetite.

Catalepsy—waxy flexibility, the patient retaining the posture imparted to him.

Catamnesis—the medical history of a patient following an illness or a behaviour disorder.

Catatonia—one of the phases or types of the schizophrenic reaction.

Causalgia—intense, burning pain.

Circular insanity (manic-depressive)—marked by alternating manic and depressive episodes.

Climacteric—period of cessation of gonadal function.

Coma—unconsciousness from which the patient cannot be aroused.

Commotio—concussion.

Compulsive movements—arising despite the patient's will.

Confabulation—relation of imaginary experiences.

Coordination—harmonious working together of parts and normal sequence of functions.

Crisis—paroxysmal attack of pain (for example, pain in the internal organs in tabes dorsalis).

Cyclothymia—mild form of the manic-depressive reaction.

Delirium—a condition of mental excitement with disorientation in time and place, and an abundance of hallucinations.

Delusion—a false belief due to disease, at variance with reality and maintained in the face of incontrovertible evidence to the contrary (for example, the patient asserts that his heart is encased in metal). It is a sure sign of mental disease.

Delusion, residual—residual delusional statements of patients during the period of convalescence.

Dementia—deterioration or loss of the mental faculties.

Detoxication therapy—treatment aimed at eliminating poisonous substances from the body.

Diplopia—double vision, one object being seen as two.

Dipsomania—recurrent periodic compulsion to excessive drinking of alcoholic beverages.

Disorientation—inability of the patient to orient himself in time, space and sometimes in his own personality.

Dissimulation—conscious striving of patient to conceal his morbid condition.

Double orientation—patient's belief that he is simultaneously in two places, for example, hospital and prison, that he is surrounded by patients and at the same time specially assigned spies, etc.

Dysarthria—impairment of articulation, patients having particular difficulty in pronouncing complex words and in speaking fast.

Dysphagia—difficulty in swallowing, or inability to swallow.

Echolalia—meaningless repetition of words spoken by others.

Echopraxia—automatic imitation by the patient of another person's movements.

Electroencephalography—method of recording graphically the electric activity of the brain.

Encephalitis—inflammation of the brain.

Enuresis—incontinence of urine.

Euphoria—exaggerated sense of well-being.

Exophthalmos—abnormal protrusion of the eyeball from the orbit.

Hallucinations—perceptions without external stimuli.

Hallucinations, false (pseudohallucinations)—having no projection in external space and perceived by the patient not through the sense organs, but, as it were, "by the mind's eye or ear".

Hallucinations, hypnagogic—occurring while falling asleep and in a drowsy state.

Hallucinations, true—hallucinatory images appearing as real and precisely projected by the patient in space.

Hallucinosis—syndrome characterized by marked and persistent (as a rule, auditory) hallucinations. Most commonly observed in cerebral syphilis and alcoholism.

Hemianopsia—blindness in one half of the visual field.

Hemicrania—migraine.

Hemiparesis—paresis of one side of the body.

Hemiplegia—paralysis of one side of the body.

Herpes zoster—affection of a dorsal root ganglion accompanied by a herpetic outbreak along the course of a nerve.

Homosexuality—sexual attraction by members of one's own sex.

Hydrocephaly—an increase in the volume of cerebrospinal fluid within the skull.

Hyperacusia—abnormal acuteness of the sense of hearing.

Hyperesthesia—excessive sensibility.

Hyperkinesia—forced movements due to increased subcortical activity. Often observed in chorea.

Hyperreflexia—an increase in reflexes above normal and observed, for example, in spastic paralyses.

Hypersomnia—excessive sleepiness.

Hypertonia—excess of muscular tonicity.

Hypesthesia—abnormally diminished sensitiveness.

Hypnosis—partial sleep.

Hypochondriac ideas—morbid anxiety about one's own health with complaint of imaginary disorders.

Hypomimia—weakening of the facial muscles with inadequate expression of the face.

Hypotonia—decrease in normal tonicity or tension, for example, diminished muscular tone in flaccid paralyses.

Iatrogenia—aggravation of the patient's condition due to statements made by the medical personnel concerning the patient's disease and heard by the patient.

Idiocy—the lowest grade of inborn mental deficiency (oligophrenia).

Illusion—a false interpretation of a real sensation. For example, a stick lying in the grass is perceived as a snake.

Imbecility—an intermediate grade of inborn mental deficiency (oligophrenia).

Inadequate countenance—not corresponding to the patient's emotional experiences.

Infectious chorea—rheumatic affection of the brain with predominant phenomena in the subcortical structures.

Intention tremor—a slow coarse tremor of the limbs, which intensifies upon voluntary movement and may cease on rest. It is often present in multiple sclerosis.

Interoceptors—nerve endings in the internal organs, vessels, etc.

Intoxication psychoses—conditions connected with poisoning, as delirium tremens.

Involutional psychotic reactions—psychotic reactions occurring in the involutional period (period of regression of the human organism).

Jacksonian epilepsy—focal epilepsy characterized by spasmodic contractions of certain groups of muscles or paroxysmal paresthesias in certain skin areas depending on the part (focus) of the cortext stimulated.

Kernig's sign—reflex contraction of the flexors of the shank resisting extension, the patient in a supine position with legs flexed in the hip and knee. One of the important and early symptoms of meningeal affection.

Kleptomania—obsessive and useless stealing.

Korsakov's psychosis—disease described by S. Korsakov in 1889 in persons suffering from chronic alcoholism; it is characterized by polyneuritis and memory disorders (see "Amnestic syndrome").

Labile—unstable; readily changing.

Lasègue's sign—elevation of the extended lower extremity produces pain in the sciatic nerve (see "Sciatica").

Leptomeningitis—inflammation of the pia mater and arachnoid of the brain or the spinal cord.

Lethargy—long, deep sleep, as in epidemic encephalitis.

Lipmann's sign—appearance of visual hallucinations upon pressure on the eyeballs; often observed in patients soon after delirium tremens.

Manic phase—one of the possible periods in the course of the manic-depressive reaction.

Manic state—morbidly high spirits combined with marked psychomotor excitement.

Marasmus—combination of somatic and mental deterioration leading to physical helplessness and dementia as a result of a severe and irreversible affection of the brain (for example, in senile psychosis, general paresis, etc.).

Melancholia—depressed and painful emotional state combined with general inhibition.

Meningitis—inflammation of the meninges.

Mentism—formation of involuntary and superfluous mental images.

Microcephaly—congenital hypoplasia of the cerebrum with a thick skull and early closure of the fontanels, resulting in a small head.

Microglia—small neuroglia cells of the central nervous system (Hortega cells).

Miosis—constriction of the pupils.

Monoplegia—paralysis of a single limb or of a single muscle or group of muscles.

Moronity—mild form of mental deficiency (oligophrenia); feebly marked mental backwardness.

Mutism—condition or state of being speechless, although the patient understands other people's speech, his vocal organs are uninjured and there is no visible lesion in the cerebral speech centres.

Mydriasis—dilatation of the pupils.

Myelitis—inflammation of the spinal cord.

Myopathy—any disease of the muscles.

Narcolepsy—attacks of pathologic sleep.

Narcomania—morbid craving for narcotics due to habituation.

Negativism—the state when the patient is indifferent and even resistant to all external influences.

Neuralgia—pain along the course of a nerve.

Neuritis—inflammation of a nerve.

Neuroglia—fibrous and cellular, non-nervous, supporting elements of the nervous system.

Neuron—complete nerve cell with all its processes.

Nystagmus—oscillatory movements of the eyeballs.

Obsessive ruminative state—psychoneurotic disorder characterized by continuous morbid preoccupation with certain ideas and fears of which the patient is fully aware and critical.

Oligophrenia—feeble-mindedness; inborn mental deficiency.

Paralysis—total loss of movement.

Paranoid form of schizophrenic reaction—a form with delusions as the main feature of the clinical picture.

Paraplegia—paralysis of the legs and lower part of the body.

Paresis—incomplete paralysis; muscular weakness.

Parkinsonism—extrapyramidal syndrome arising after encephalitis or in paralysis agitans.

Perseveration—persistent repetition of words or some activity.

Philosophizing—useless, aimless, spurious reasoning.

Phobia—specific neurotic fear.

Photopsia—elementary visual hallucinations.

Pick's disease—a form of senile psychosis with a picture of increasing feeble-mindedness; based on atrophy of the cerebral cortex, mainly in the areas of the frontal and parietal lobes.

Poliomyelitis—infantile paralysis, Heine-Medin's disease; based on lesions in the anterior horns of the grey matter of the spinal cord.

Polyneuritis—multiple inflammation of nerves.

Presenile—preceding old age.

Pseudodementia (false feeble-mindedness)—a form of hysterical reaction.

Pseudohallucinations—see *Hallucinations false.*

Psychasthenia—a neurosis characterized mainly by mental debility combined with an anxious and doubting character.

Psychogenic—resulting from a psychic trauma.

Psychopathia—pathologic character with predominant disturbances in the emotional and volitional spheres.

Psychotherapy—treatment of disease by explanation, persuasion and suggestion.

Ptosis—prolapse, abnormal depression or falling down of an organ; applied especially to drooping of the upper eyelid.

Puerilism—form of hysterical reaction manifested in childish behaviour.

Quincke's disease—limited swelling of a portion of the skin or mucous membrane (of angioneurotic origin).

Radiculitis—inflammation of a nerve root.

Reactive depression—mental disorder manifested mainly in depressive mood and due to psychic trauma.

Reflex—reaction of an organism to a stimulus effected through the nervous system.

Remission—abatement or subsidence of the symptoms of disease.

Residual delusion—see *Delusion, residual.*

Retrograde—going backward.

Romberg's sign—sign for tabes dorsalis in which the patient cannot maintain equilibrium when standing with feet together and eyes closed.

Sadism—sexual perversion in which pleasure is derived from inflicting cruelty upon another.

Scanning speech—slow and measured form of speech with pauses between syllables.

Schizophasia—scrambled speech.

Sciatica—inflammation of the sciatic nerve.

Somatic—pertaining to the body; physical.

Somnambulism—sleepwalking.

Spasm, clonic—involuntary general paroxysm of muscular contraction with relaxation.

Spasm, tonic—involuntary general paroxysm of muscular contraction without relaxation.

Spasmophilia—morbid tendency to convulsions and to tonic spasm in early childhood due to disturbances in calcium metabolism.

Status epilepticus—condition in which epileptic attacks occur in rapid succession, the patient not regaining consciousness during the intervals.

Stereotypy—monotonous, senseless repetition of phrases, words, movements.

Stupor—condition of being but partly conscious or sensible, with difficulty in perceiving the surroundings.

"Sucking" symptom—protrusion of the patient's lips in response to contact with the lips.

Syndrome—aggregate of symptoms constituting a distinct clinical picture.

Synergy—correlated action or cooperation.

Tabes dorsalis—disease caused by syphilitic affection of the posterior columns and roots of the spinal cord.

Tetraplegia—paralysis affecting the four extremeties of the body.

Tic—involuntary twitching of muscles.

Trismus—tonic spasm of the muscles of mastication.

Vegetative syndrome—complex of vegetative disturbances (disorders of perspiration, vasomotor phenomena, etc.).

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